THE BULLETIN

AUGUST

1937

—

VOLUME 5

—

NUMBER 3

—

NATIONAL ASSOCIATION

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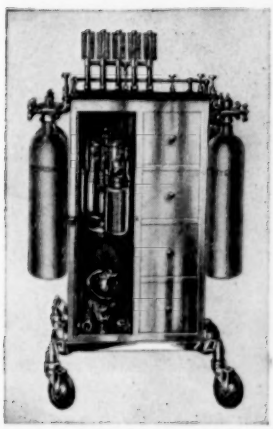

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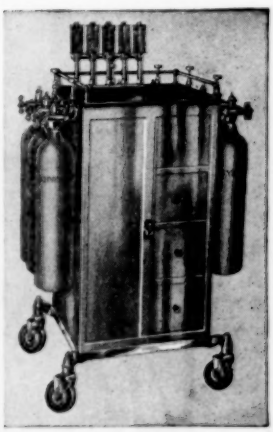

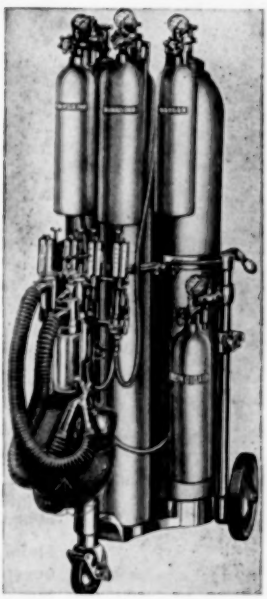

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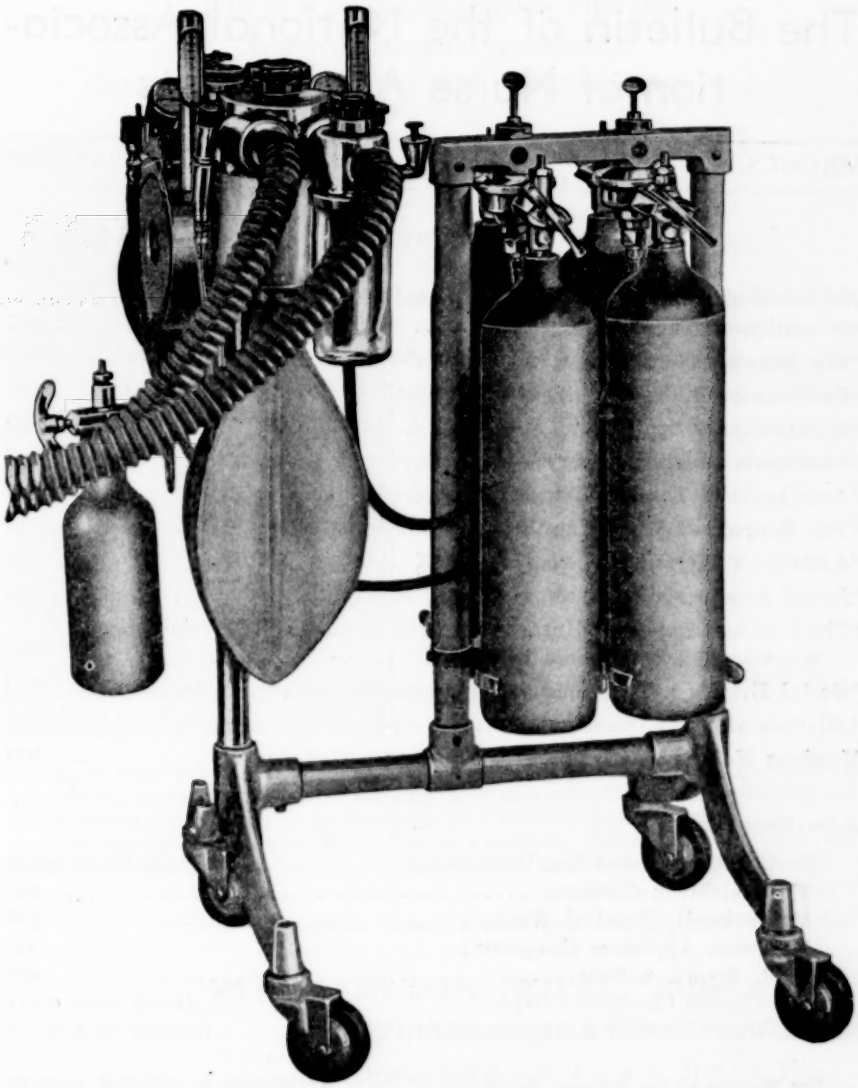

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Literature on Request

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The Bulletin of the National Association of Nurse Anesthetists

VOLUME 5, NO. 3 AUGUST, 1937

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The Bulletin of the National Association of Nurse Anesthetists is published quarterly by the National Association of Nurse Anesthetists; Executive, Editorial and Business Offices, 2065 Adelbert Road, Cleveland, Ohio.

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FIFTH ANNUAL MEETING
NATIONAL ASSOCIATION OF NURSE ANESTHETISTS

Will be Held in Conjunction with the

American Hospital Association

September 14th to 17th, 1937 Atlantic City, N. J.

The Ritz-Carlton Hotel has been chosen as the convention headquarters. It is situated on the Boardwalk, within walking distance of the Atlantic City Auditorium, where general sessions will be held. Hotel reservations must be made early.

Each year the interest in the annual meeting increases, together with the attendance; and with the added attractions of this most famous and alluring seashore resort, the convention promises to be a most inspiring event.

For details write Miss Mary Lucile Goodman, Executive Secretary, 2065 Adelbert Road, Cleveland, Ohio. Program will be found on pages 326-328.

(For reservation detach and return this slip to the Ritz-Carlton Hotel, Atlantic City, N. J.)

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PROGRAM

Fifth Annual Meeting

NATIONAL ASSOCIATION OF NURSE ANESTHETISTS

Atlantic City, N. J.

September 13th to 17th, 1937, inclusive

Monday, September 13th

Registration Desk and Exhibition Hall open all day

9:00–12:00 A.M.	Meeting of Board of Trustees
1:30 P.M.	Meeting of Board of Trustees with Publishing Committee
2:00 P.M.	Meeting of Board of Trustees with Membership Committee
2:30 P.M.	Meeting of Board of Trustees with Revisions Committee
3:00 P.M.	Meeting of Board of Trustees with Public Relations Committee
3:30 P.M.	Meeting of Board of Trustees with Educational Committee

Tuesday, September 14th

GENERAL SESSION

Presiding—Gertrude A. Troster
Memphis, Tenn.

10:00 A.M.	Invocation—The Reverend K. R. Perinchief St. Paul's Methodist Episcopal Church, Atlantic City, N. J.
10:15 A.M.	Address of Welcome—The Honorable Charles D. White, Mayor of Atlantic City
10:30 A.M.	Greetings from the American Hospital Association— Claude Munger, M.D., President
10:45 A.M.	Address of Welcome—Hilda R. Salomon President, National Association of Nurse Anesthetists
11:00–12:00 A.M.	Demonstration of various anesthesia machines by members of the National Association of Nurse Anesthetists

THE RITZ-CARLTON HOTEL

ATLANTIC CITY, N. J.

CONVENTION HEADQUARTERS

National Association of Nurse Anesthetists

September 13-17, 1937

AFTERNOON SESSION

Presiding—Louise Schwarting
Lutheran Hospital, Fort Dodge, Iowa

2:00 P.M. "Status of the Nurse Anesthetist in Pennsylvania"—
The Honorable Charles G. Margiotti
Attorney-General of Pennsylvania

2:15 P.M. "Chloroform"—
Laura Bryant, Cooper Hospital, Camden, N. J.
Discussion by Faye Fulton, Methodist Hospital, Philadelphia

2:30 P.M. "What Constitutes Efficient Anesthesia Service"—
Howard A. Bradshaw, M.D.
Jefferson Hospital, Philadelphia, Pa.

2:45 P.M. "Ethylene versus Cyclopropane"—
Sister Rudolpha, St. John's Hospital, Springfield, Ill.

3:00 P.M. "Dangers of Avertin"—
Donald Guthrie, M.D., F.A.C.S. and
Felix A. Hughes, M.D.
Presented by Charles H. DeWan, M.D., Pathologist, Robert Packer Hospital, Sayre, Pa.

3:15 P.M. "Anesthesia for Negro Patients"—
Mrs. Jennie Hauser, Memphis General Hospital, Memphis, Tenn.

3:30 P.M. "Thoracic Surgery and Cyclopropane Anesthesia" — with slides
Moses Behrend, M.D., F.A.C.S.,
Philadelphia General Hospital,
Mount Sinai Hospital,
Jewish Hospital, Philadelphia, Pa.

7:00 P.M. Banquet—National Association of Nurse Anesthetists
Ritz-Carlton Hotel
Invocation
Introduction of Guests
Guest Speaker—Mr. Robert Jolly
Memorial Hospital, Houston, Texas
Music

Wednesday, September 15th

MORNING SESSION

Presiding—Anna Willenborg
St. Joseph Hospital, Chicago, Ill.

10:00 A.M. Questions and Answers
(All members desiring to have questions answered please submit same to Miss Mary Lucile Goodman, Executive Secretary, National Association of Nurse Anesthetists, 2065 Adelbert Road, Cleveland, Ohio, *before September 1st)*

11:00 A.M. "Anesthesia Records"
Malcolm MacEachern, M.D.
Associate Director American College of Surgeons, Chicago, Ill.

11:30 A.M. "What the Hospital Anesthetist Is and Is Not"—
J. C. Doane, M.D., F.A.C.P.,
Medical Director, Jewish Hospital, Philadelphia, Pa.
Clinical Professor of Medicine, Temple University, Philadelphia, Pa.; Editor, Modern Hospital

AFTERNOON SESSION

Presiding—Mae Stone
Presbyterian Hospital, Newark, N. J.

2:00 P.M. "Positive and Negative Pressure in Anesthesia"—
Dorothy Hoadley, Methodist Hospital, Fort Worth, Tex.

2:15 P.M. "Anesthesia and Analgesia"—
Clifford B. Lull, M.D., F.A.C.S.,
Ass't Professor Obstetrics and Gynecology,
Jefferson Medical College, Philadelphia, Pa.
Chief of Service "A" Gynecology and Obstetrics,
Pennsylvania Hospital, Philadelphia, Pa.

2:30 P.M. "Anesthetic Mortality"—
William T. Lemmon, M.D.,
Philadelphia General Hospital; Instructor in Surgery,
Jefferson Medical College, Philadelphia, Pa.

2:45 P.M. "Anesthesia in Gynecology"—
Charles Lintgen, M.D., Philadelphia, Pa.

3:00 P.M. Panel Discussion—"What the Hospitals and Surgeons Expect of the Nurse Anesthetist"
George F. Muller, M.D., F.A.C.S.,
Professor of Surgery, Jefferson Medical College, Philadelphia
and Mr. Melvin Sutley
Superintendent, Delaware County Hospital, Philadelphia

7:00 P.M. Banquet — American Hospital Association
Ambassador Hotel

Thursday, September 16th

9:00 A.M. BUSINESS MEETING
(for members only)
Presiding—Hilda R. Salomon, President
Report of Executive Secretary
Report of Treasurer
Reports from Chairmen of Standing Committees
New Business
Election of Officers

Afternoon Session

Presiding—Ida Maude Edwards
Strong Memorial Hospital, Rochester, N. Y.

2:00 P.M. "Cyclopropane"—
Sister Borromea Suplicka, St. Francis Hospital, Peoria, Illinois
Discussion by Mrs. Frances Hess, Long Island College Hospital, Brooklyn, N. Y.

2:45 P.M. "Oxygen Therapy"—
Esther Myers, Queens Hospital, Honolulu, Hawaii

3:00 P.M. "Organization Problems"—
(Round table discussion for State Officers or other members interested in organization work)
Conducted by Verna M. Rice, Mobile, Ala.

Friday, September 17th

9:00 A.M. Clinic at Atlantic City Hospital
David B. Allman, M.D.,
Chief Surgeon, Atlantic City Hospital

2:00 P.M. Afternoon Closing Session
Introduction of New Officers

2:30 P.M. Meeting of the Board of Trustees

THE PHARMACOLOGY OF ANESTHETIC DRUGS*

CLAYTON S. SMITH, Ph.D., M.D.

Department of Physiological Chemistry and Pharmocology,

Ohio State University

Columbus, Ohio

The use of anesthetics in the practice of medicine and surgery is usually regarded as a modern innovation. However, recent historical research indicates that the ancients possessed knowledge of drugs that would deaden pain. The sleeping potions of antiquity and of the Middle Ages contained drugs capable of profound action upon the body in addition to their sleep-producing properties.

The deadening of pain by soporific potions was known to some primitive peoples as well as those of the earliest civilizations. Helen cast nepenthe, a deodorized opium preparation, into the wine of Ulysses, and the Talmud of the Jews mentions a narcotic. In addition there is the bhang of the Arabian nights and the drowsy syrups of Shakespeare's time. Opium and Indian hemp or hashish were probably known to the Egyptians and Greeks, and the mandrake to the Babylonians and Hebrews. This mandrake is not the American mandrake or May apple but is the European plant, Mandragora.

Mandrake wine was used to deaden pain in surgical operations in the time of Nero, and the mandrake has played a part in early English and German folklore. Among other superstitions is the tale that its roots, which by a stretch of imagination are supposed to resemble human form, shriek when the plant is uprooted. This shriek was supposed to cause madness in those who heard it. Shakespeare has Juliet say "And shrieks like mandrakes torn out of the earth—that living mortals hearing them run mad." Mandrake was the chief ingredient of a preparation known as morion wine. Records show that this wine was used in a maternity hospital endowed at Constantinople by Theresa, mother of Constantine the Great. The vinegar offered on a sponge at the Crucifixion is believed by some to have been morion wine. Mandrake was the most popular substitute for an anesthetic during the Middle Ages. It held its vogue up to the 16th century.

In addition to mandrake other drugs containing alkaloids were known to the ancients, particularly members of the belladonna family and opium. The plants of the belladonna family because of the similarity in their chemical composition may be used almost interchangeably. Whether one or the other was used exclusively at certain historical epochs depended more on convenience or superstition than on any particular character of the plant. We have already mentioned mandrake, a member of the belladonna family. The dilated pupils and delirium produced by doses of this drug caused it to be used in sorcery and magic as well as in medicine. Not only were preparations of these drugs given singly but mixtures of preparations from various drugs were used as well. It follows

* Read at the fourth annual meeting of the Ohio Association of Nurse Anesthetists, Columbus, Ohio, April 13th, 1937.

then that the most powerful anesthetic of the Middle Ages would be a mixture containing opium and some member of the belladonna family. We would have in such a mixture a scopolamine-morphine anesthesia because the opium would contain morphine and the mandrake, for example, scopolamine. The modern scopolamine-morphine anesthesia could be considered as a reversion to an ancient practice. The chief advantage in the modern use of these drugs is that they are administered quantitatively and in a pure form.

The discovery of the means of producing a complete and safe anesthesia is an accomplishment of the 19th century (1842-1847). The credit for this discovery must be divided among several investigators: Sir Humphrey Davy for the suggestion of the use of nitrous oxide; C. W. Long for the independent discovery but inadequate publication of ether anesthesia; Horace Wells for the successful use and publication of nitrous oxide; Jackson and Morton for the successful public demonstration of etherization and Flourens and Simpson for the introduction of chloroform.

The proper administration of anesthetics requires a knowledge of their effects on the important individual functions in the successive stages. The task of the pharmacologist is to explain the action of drugs. The effect of a drug may be obvious but just how that effect is produced and through what channels the drug acts may not be quite so clear. That division of pharmacology which concerns itself primarily with the site of the action of a drug and the mechanism through which it acts is called pharmacodynamics. It is from the standpoint of pharmacodynamics that I want to discuss anesthetics.

It will be generally agreed that unconsciousness is the outstanding result of anesthesia. While we all have a general idea of what is meant by unconsciousness, yet when regarded closely the word covers a wide range of stages or degrees. To illustrate: Under some anesthetics a patient may talk incoherently throughout the operation and yet afterward have no recollection of what happened. The patient even when he does not store up sensory impressions may react to them. For example, a patient in the early stage of anesthesia when his broken ankle was palpated, sat up suddenly and bowled the surgeon over with a blow, but his expression was unchanged and he had no recollection of the occurrence.

The storing up of sensory impressions in man and higher animals is a function of the cerebral cortex. As judged from the lack of memory the cerebral cortex must be depressed by anesthetics. On the other hand when such reactions occur as given in the illustration, we must assume that certain other areas of the cortex are not completely depressed. Whether the depression is in the frontal or parietal lobes or more widely diffused we do not know. It is assumed that by the time a patient reaches the third stage in a general anesthesia, the cerebral functions as well as those of some of the lower levels in the brain stem are depressed.

There are many drugs of relatively simple chemical composition, derivatives of the methane series of hydrocarbons, which cause depression of the central nervous system, more especially the cerebrum. Among them are the universally used surgical anesthetics, the soporifics, and alcohol. The general action of all of these is similar in character and consists of a first stage of imperfect consciousness and confused ideas followed by one of excite-

ment and eventually by complete unconsciousness which may result in death. The second stage is much more marked after some drugs than after others and is often absent. It has given rise to the theory that the cells are first stimulated, then depressed. The alternative explanation is that the functions of control and inhibition are lessened and that the motor centers are free and may act more strongly. This question has received the most discussion as regards alcohol—whether it is a stimulant or a depressant.

The different members of the group vary widely in their chemical composition and their tendency to enter into chemical combinations. No relation can be found between their narcotic action and the presence of any one radical. The most widely accepted theory is that of Meyer and Overton, which states that the degree of narcosis is dependent upon relative solubility of the anesthetic in oil and in water; this relation is sometimes spoken of as the partition coefficient.

The anesthetics dissolved in the watery blood plasma tend to pass into the lipid or fatty tissue and as the nerve cells are richest in lipids the anesthetic accumulates in the brain. The presence of the anesthetic in the brain cells renders them more fluid and upsets the normal relation of the various constituents, thus impairing the function of the cells; in other words causes narcosis.

This theory has much experimental evidence to support it. The narcotic power and the partition coefficient are in accord with the theory when one considers members of the same chemical homologous series, the alcohols for example. The narcotic action increases in the series as follows: methyl, ethyl, propyl, butyl and amyl; likewise the tendency of these alcohols to pass from water to oil rises similarly. On the other hand, when hydroxyl groups are added, as in the series ethyl alcohol, glycol and glycerine, the partition coefficient between oil and water falls and the narcotic action declines.

This theory serves to show that these physical properties are factors in the narcotic action. But this is not all. When dissimilar substances are compared the partition coefficient and the narcotic action do not agree so closely. The relative coefficients for alcohol, chloral and acetone are 1:2:6 but their narcotic action is 1:16:1. There is evidently some as yet unknown factor that plays a part.

It seems likely that the distribution in the tissues and the concentration of the narcotics in the central nervous system are largely determined by the relative solubility in water and lipids but after the narcotics reach the brain cells the effects depend upon an unknown factor.

Since the most widely used general anesthetics are given by inhalation, the action of the drugs on the respiration might well be considered first. The respiration is influenced not only by the direct action of the anesthetic but by the patency of the respiratory channels, by local and distant reflexes and by the state of circulation in the lungs. In early stages the respiration is apt to be irregular on account of choking, struggling or local irritation, especially if the administration is started abruptly. The choking is due to a reflex stimulation of the fifth nerve which supplies the posterior part of the throat and is more pronounced with ether than with chloroform. It is less likely to occur if diluted vapors are employed.

As the patient passes into anesthesia the breathing becomes regular and noisy. The snorting and stertor are

generally produced by the vibration of the tongue against the pharyngeal wall. Stridor is laryngeal and is due to spasm or paralysis of the vocal cords or to obstruction of the glottis by mucus.

The principal factors affecting respiration under anesthesia are as follows:

1. Threshold of excitability for carbon dioxide: elevated by morphine, chloroform and deep etherization; lowered by light etherization, acidosis of deficient oxidation and by fear.
2. Carbon dioxide content of the blood: acts as stimulant to respiration; varies inversely as ventilation.
3. Threshold of excitability for afferent impulses: this is raised by deficiency of carbon dioxide and by morphine, chloroform and ether; lowered by fear.
4. Intensity of afferent impulses, especially pain and psychic.
5. Inhibitory cerebral impulses, such as fortitude of the patient.

The several anesthetics act differently on these factors. Morphine raises the threshold for carbon dioxide and quiets excitement. Chloroform raises the threshold more for afferent impulses than for carbon dioxide. Ether may lower the carbon dioxide threshold while the afferent threshold may be raised.

In considering the effects upon the circulation, ether and chloroform should be considered separately. In the case of ether, in the early stages of anesthesia the pulse rate and blood pressure are increased by reflexes, excitement and incipient asphyxia. During anesthesia, the pulse rate is increased to from 80 to 110 and the blood pressure is practically unchanged in animals, or in man may be somewhat above normal. There is generally some venous congestion, especially if a closed method of anesthesia is used. The vascular changes are central and the cardiac changes are indirectly due to the vascular disturbance. The heart muscle and the vagus excitability remain unchanged. Concentrations of ether which injure the heart directly can only be reached in perfusion experiments.

This does not hold true for chloroform. In normal chloroform anesthesia with carefully graduated administration the pulse and blood pressure in the pre-anesthetic stage are somewhat irregular but generally increased and the face flushed similarly to ether. As anesthesia is reached or shortly thereafter, the blood pressure declines progressively. In an hour it may fall to half the normal level and in two and one-half hours to one-third the normal level. This fall is due to a depression of the vasomotor center. The vessels are dilated but constrict on stimulation of their nerves. The depression of the center can be shown by the perfusion method. The dilatation involves mainly the splanchnic area. The pulse is soft and slow but regular. The respiration is regular and efficient. The vasomotor depression is not necessarily harmful unless prolonged.

In prolonged anesthesia the heart is more or less injured by the direct action of the chloroform as well as by the low blood pressure and the asphyxia. It is probable that degenerated heart muscle is more subject to these injuries. Ordinarily the vasomotor paralysis dominates the circulatory phenomena until death, the heart beating after respiration has stopped, although it may not be able to maintain a circulation.

With faulty administration, events are quite different. Excessive amounts of chloroform vapor, particularly when anesthesia is incomplete, stop the cir-

culation before the respiration. This is the usual mode of chloroform death. The cardiac arrest may be due to direct or reflex vagus stimulation, to asphyxia, to fibrillation or to paralysis of the cardiac muscle, or a combination of all of these. Reflex disturbances are most dangerous in incomplete anesthesia where the reflex response is active, and in very deep anesthesia when the low blood pressure may make even slight reflex changes fatal.

The temperature falls during ether and chloroform anesthesia, partly through diminished heat production and partly through heat loss. The diminished production is reflected by diminished carbon dioxide formation and is due to decreased muscular movements and tone. The increased loss is due to narcosis of temperature regulation aided by exposure and to a slight extent by the cooling action of the vapor. Clinically ether and chloroform produce about an equal fall of temperature. In operations on man the fall is from 1 to 4 degrees Fahrenheit, averaging 2.5 degrees. It is much greater in prolonged operations on animals.

Both ether and chloroform bring about a gradual abolition of all spinal reflexes and produce complete muscular relaxation in the anesthetic stage. The reflexes vary with marked uniformity with the concentration of the anesthetic in the blood. The reflexes disappear in a rather definite order but this is not the same for ether and chloroform, indicating that their actions are not strictly alike. Among the last reflexes to disappear are the corneal, laryngeal, pharyngeal, rectal, vesical and genital. The patellar reflex persists very late.

Ether and chloroform produce nausea and vomiting, sometimes during induction but especially when the patient awakens. This action is mainly central but the swallowing of mucus containing the anesthetic may also contribute. By their action on the muscle and the peripheral innervation, ether and to a greater extent chloroform relax the tone and arrest the movements of the entire tract from the stomach to the rectum. Acute dilatation of the stomach is sometimes a serious complication. After deep narcosis, especially with chloroform, complete paralysis of the stomach and intestines may persist for two hours, incomplete paralysis for twenty hours. The paralysis after laparotomies is only partially due to the anesthetic and mainly to operative procedures.

The size of the pupils in anesthesia varies with the stage. In the excitement stage they are dilated, with the light reaction moderately decreased. In many cases the pupils are constricted, with the light reflex diminished or abolished. The eyes are turned inward and upward as in sleep. This is due to the abolition of the cerebral impulses which normally inhibit the constrictor tone of the occular motor center.

Ether is unoxidized in the body. Seventy-two to ninety-two per cent may be recovered from the expired air and the remainder from the other excretions. A small amount of chloroform is decomposed in the tissues with the production of sodium chloride, which is excreted by the urine. Post-anesthetic albuminuria occurs in about one-fourth of the ether anesthesias and about one-third of the chloroform anesthesias. With previously sound kidneys this usually passes off in a short time. In patients with chronic nephritis there may be fatal suppression of urine. Chloroform is apparently more injurious than ether but the difference is slight. Inhalation anesthesia, whether by ether, chloroform or nitrous oxide, tends to reduce the alkaline re-

serve of the body. The reduction is greatest with chloroform.

The effects of the most widely used anesthetics on the important functions of the body have been discussed in the light of their pharmacological action.

The rapid progress made in research in organic chemistry has produced many substances possessing anesthetic properties. One of the first of this group to be used was ethyl chloride. On account of its great volatility the anesthesia appears and disappears very rapidly. It has the same dangers as chloroform. Large doses paralyze the heart directly. It is even more dangerous because of its sudden action without much warning. The main advantage is the rapidity with which the anesthesia is produced.

In 1926 tribromethanol was introduced as a fixed dose anesthetic under the name of avertin. Its action is quite similar to that of chloroform. It is doubtful whether the bromine present plays any direct part in the anesthesia. Since avertin is only slightly soluble in water and the aqueous solutions are unstable, avertin liquid was placed on the market. This is a solution of the substance in amylene hydrate weight for weight, i. e., 1 cc. contains 1 gram of avertin. It is unfortunate that amylene hydrate was used as the solvent because it has some anesthetic properties of its own. Avertin liquid therefore probably combines the anesthetic action of both drugs. In neurosurgery this drug is preferred because it lowers the intracranial pressure, which is generally raised by inhalation anesthetics. The effects and fatalities of avertin approach those of chloroform.

When injected rectally 50 per cent may be absorbed in 10 minutes, 75 per cent in 20 minutes and the remaining 25 per cent slowly. The excretion occurs by the urine almost as rapidly, so that the sojourn of the drug in the body is very brief. Seventy to eighty per cent is excreted in the first 30 minutes and 95 per cent in the first two hours. When the renal function is impaired the toxicity is considerably increased.

Avertin may produce a serious fall in blood pressure and depression of the respiration which may be fatal. The therapeutic margin is narrower than with ether. The clinical mortality approaches that of chloroform, and a large proportion of the recorded deaths occurred with the ordinary therapeutic dose of 75 to 100 milligrams per kilogram. The respiratory center is depressed and there is a diminished response to carbon dioxide.

Avertin generally produces a fall in blood pressure of short duration (about 8 minutes). This involves a depression of the heart and of the vasomotor center and a direct action on the blood vessels. The heart is depressed directly by tribromethanol and by amylene hydrate. Avertin causes a fall in temperature, a rise in blood sugar and a lowering of the alkali reserve.

Another of the newer anesthetics is ethylene, which was introduced clinically in 1923. The stupefying effect of ethylene and its similarity to nitrous oxide was recognized as early as 1864. Animal experiments were tried by various workers between then and 1885 but it was not tried for surgical anesthesia. For a period of thirty-three years no further work was done. Then the properties of the gas were re-investigated by several workers and the clinical application made in 1923.

Ethylene is an aliphatic narcotic with low toxicity but with very rapid action and recovery due to its volatility. Full anesthesia requires about 90 per cent of ethylene and 10 per cent of oxygen, and is established in about half the

time for the ordinary nitrous oxide-oxygen anesthesia. The anesthesia and relaxation are deeper, and the recovery more rapid, the patient being usually awake with a clear mind within two minutes after the discontinuance of the anesthetic. The percentage of ethylene may be gradually reduced to 80 per cent during long anesthesias. The rapid action and recovery demand constant attention on the part of the anesthetist. The mechanism of the action of this drug is due to the high partition coefficient $\frac{\text{solubility in oil}}{\text{solubility in water}}$.

Ethylene depresses only slightly the gastric movements but stimulates the movements of the large and small intestines in contrast to other inhalation anesthetics. In animals the carbon dioxide production is depressed only in proportion to muscular relaxation. The respiratory center is not depressed. The blood pressure rises about 10 millimeters, showing that the vasomotor center is not affected. The temperature falls but little. Excised hearts are not injured by saturating the perfusion mixture with ethylene.

The chief danger in the use of this anesthetic is that of an explosion of the ethylene-oxygen mixture in the presence of a spark or free flame. No deaths from ethylene explosions have been reported in recent years.

Other related hydrocarbon gases have been used as anesthetics. Cyclopropane was introduced in 1929. It has been used with good results at the University of Wisconsin and in Montreal. Like ethylene, its chief drawback is its explosive nature.

Propylene, which has the same chemical formula as cyclopropane but with a different structure, has been suggested as an anesthetic. It acts similarly so that a fifty per cent concentration induces unconsciousness in two minues in man. Thirty-seven to forty per cent of the gas suffices for anesthesia. The administration is not unpleasant and recovery is rapid. In animals toxic effects appear slowly when the concentration reaches 65 per cent and rapidly when 70 per cent is reached.

Acetylene has also been used as an anesthetic, but its use has not become popular because its advantages do not appear to be sufficiently great to balance its disagreeable odor.

The gases discussed so far have been hydrocarbons, that is, they contain only hydrogen and carbon in their make-up.

The oldest gas used as an anesthetic is nitrous oxide or laughing gas. The gas was first prepared by Priestley about 1776. Sir Humphrey Davy announced its anesthetic properties in 1799. The application of its anesthetic properties was first made by a dentist, Dr. Horace Wells, in 1844. The use of a mixture of nitrous oxide and oxygen is credited to Dr. Edmund Andrews of Chicago in 1868. The technique of the use of such mixtures in surgical operations has been greatly elaborated in recent years. For short operations, as in dentistry, the gas is given undiluted. Partial anesthesia with loss of consciousness occurs in 20 to 30 seconds, complete anesthesia in 50 to 120 seconds, with an average of 56 seconds.

Nitrous oxide is very soluble in the blood, which takes up 45 per cent by volume. It was first believed that the gas acted as an asphyxiant. This, however, can be shown not to be the case because anesthesia persists even when oxygen is mixed with nitrous oxide. Evidently the nitrous oxide has a direct action on the central nervous system, first stimulating the psychic areas and then depressing them to insensibility. The motor reflexes are abolished. Nitrous oxide has no action on the

medullary centers and the circulation is not changed in the absence of asphyxia. Nitrous oxide has no effect on any of the other tissues of the body.

The following percentages of gas and oxygen are given, with the resulting anesthesia:

Nitrous Oxide	*Oxygen*	
80	20	Subconscious analgesia
86	14	Complete analgesia
89	11	Partial anesthesia
94	6	Complete anesthesia

In the analgesic stages there is no asphyxia and no relaxation. In partial anesthesia there is slight asphyxia and slight relaxation. In complete anesthesia the asphyxia may become dangerous and the relaxation is only partial. To overcome some of these difficulties morphine and scopolamine are sometimes given before the nitrous oxide-oxygen mixture. It is claimed that by this procedure an 80-20 mixture at atmospheric pressure may be used.

Another procedure is to use one of the barbiturates as a basis for the narcosis. To this group belong such substances as barbital or veronal, allonal, amytal, nembutal and many other closely related substances. While these drugs usually act as hypnotics they may produce anesthesia when given in sufficient dosage. These drugs have a direct action on the brain, depressing the sensory and intellectual processes. When the barbiturates are given as general anesthetics they are usually administered intravenously.

Evipal is one of the newest of this group. It is given in the proportion of 0.06 cc. of a 10 per cent solution per pound of body weight, the total dose not to exceed 10 cc. The first 4 cc. are injected intravenously at the rate of 1 cc. per 15 seconds and the remainder 1 cc. in 10 seconds. The anesthesia lasts from 15 to 20 minutes, with complete muscular relaxation and rapid return to consciousness. Barbiturates as general anesthetics have a very limited use but have been mentioned in this discussion because in some localities they are being used in minor surgery.

POSITIONS IN GALLBLADDER SURGERY*

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The subject, "Positions in Gallbladder Surgery," is one that has interested me for many years. In 1913 I conceived the idea of using the elevated head and trunk position, commonly known as the "Fowler Position" to make more simple the operative procedure in gallbladder surgery. This position was first used at the Wyckoff Heights Hospital in Brooklyn. At first I used a special table with a kidney elevator at the junction of the upper and middle thirds of the table. This elevator, raised to an appropriate height in relation to the build of the patient and reinforced by ordinary bed pillows, allowed the patient to be placed in much the same position that

* Presented at the fourth annual convention of the New York Association of Nurse Anesthetists, New York City, May 20, 1937.

one assumes in a comfortable club chair with the head extended on the top of the back of the chair, though, of course, with the chest not elevated to the same extent and with the upper part of the abdomen made more prominent. The position was comfortable to the patient and interfered in no way with any method of anesthesia, except spinal. The special table proved a bit high for surgeons other than myself, so in time the same position was obtained with a round air pillow and with bed pillows on the regulation operating table. The procedure is as follows: the patient sits up, the inflated pillow is placed in the curve of the back, a pillow is placed over the air pillow in the curve of the back and pillows are piled one upon another to an appropriate height under the back and shoulders, and the patient reclines, allowing the head to rest comfortably, with the neck extended and with the upper part of the abdomen made straight.

This position allows the operation to be performed with the minimum amount of retraction and with the maximum amount of visualization of all of the parts. It makes what is at times a very difficult operation in the ordinary positions used, a very simple operation, so that I have often said that the success of the operation if divided into percentages would give 50 per cent to the position, 40 per cent to the anesthetist, 9 per cent to the assistants and 1 per cent to the surgeon.

Modern anesthesia by any of the modern methods is as different from the old methods of anesthesia as day is from night. The members of the New York Association of Nurse Anesthetists cannot remember back far enough to appreciate the blessings of modern anesthesia. I am talking about the time of forty years ago. Before your time a real anesthetist was a surgical curiosity, although there were, of course, a few who were remarkably expert. Knapp of Brooklyn was able to carry patients satisfactorily for a period of two hours under the old nitrous oxide method. Bennett of New York, who was the first to develop gradation in nitrous oxide anesthesia and then to combine it with ether, gave wonderful anesthesias. Many general surgeons began to experiment with gas-oxygen-ether, using at first the oxygen tank with the water bottle, in which ether replaced the water, and then as a next step the foot pump and then a mechanical pump and heat, in all of which Gwathmey was interested, and ingenious in combining not only gas-oxygen-ether but many other anesthetics which at the time seemed queer. The general surgeons began to experiment with various combinations in their search for safer and more satisfactory anesthesia. Willy Meyer in 1898 developed anesthol. Before that time a common method of anesthesia was a closed mask and later an open mask on which ether was dropped and the results were not pleasant either for the patient or for the surgeon, from all of which developed the nurse anesthetist, skilled in various methods of anesthesia, and also the special doctor anesthetists skilled not only in inhalation but in other forms of anesthesia. Years ago we had to hurry through an operation, dreading the effect of the anesthetic on the patient. Now the mind of the surgeon can be at rest. He no longer has to worry about how his patient will react to the anesthetic. Preliminary medication and care, with modern anesthesia, have eliminated the anesthetic risk in practically all operations. Particularly is this true of gallbladder surgery and surgery of the upper abdomen, follow-

ing which in former times pulmonary complications were frequent.

In my series of over 2,000 operations upon the gallbladder, we have rarely seen a pulmonary complication. I attribute this in part to the position used during operation and also to the fact that the elevated head and trunk position is used postoperatively. We find at times following operation upon an infected gallbladder, some congestion of the right base of the lung which never develops into any serious complication. This latter is found far less frequently when the elevated head and trunk position is used.

We find, irrespective of position, that the hepatitis which is a concomitant of gallbladder inflammation may assume alarming proportions. In 1918, E. A. Graham called attention to the fact (previously suggested by others) that in inflammation of the biliary tract there is more or less constantly associated hepatitis. It has been proved that patients with biliary disease are more prone to so-called "liver death" than with other diseases. Away back in 1890 Courvoisier reported the mortality for operations on the biliary tract as sixteen per cent. In 1935 an analysis of thirty-five thousand operations showed a mortality of six and six-tenths per cent. This is the average mortality for many surgeons. Of course, those most skilled in biliary tract surgery have a lower mortality than this, but the reduction in mortality is quite astonishing and is thought by some observers to be due in no small part to the surgeon's comprehension of the inseparable association of the liver and gallbladder in diseases of the biliary tract. No doubt the increasing number of surgeons who analyze their failures adds much to the knowledge of the disease. Analysis of this kind is most important in biliary disease because the disease is one in which most operations are operations of choice rather than emergency.

The symptoms preceding "liver death" are now well recognized and quickly follow operation. A rapidly increasing high temperature and pulse rate with rapid emaciation, weakness, delirium and dehydration are more apt to occur in advanced cases of cholecystitis having existed over a long period of time, but are not limited to those cases, occurring also in cases of cholecystitis of a mild nature, coming as a great shock to the surgeon as well as the patient. The preventive treatment is well established, consisting of infusion of glucose and saline, the overcoming of dehydration, at times glucose guarded by insulin; blood transfusion; and the clamping off of the gallbladder or common duct tube in an attempt to reëstablish the biliary pressure in the liver. Such preventives should be used in long standing cases of cholecystitis, particularly when associated with jaundice. Such treatment should be instituted immediately upon the occurrence of rising temperature and dehydration following the operation. This complication may occur in any case and in spite of the best anesthesia. Chloroform has been out of use for several years on account of its degenerative effect on the liver cells.

More and more liver deaths are reported each year. Most of these, as stated, occur following operations on the gallbladder but some are reported following operations on other organs, notably the pancreas. Six cases were reported following traumatic injury to the liver. Animal experimentation is being conducted to reproduce the same syndrome in animals. The theory advanced is that sudden deaths with high temperature and the so-called hepa-

torenal syndrome are successive stages of the same process. Operation, by relieving liver obstruction, however trivial the obstruction may have seemed, may result fatally by altering the status quo of the hepatitis, speeding it up. So it follows that the very means used to relieve the patient of the disease may in itself prove fatal through the effect of the operation on the hepatitis. An analogy is seen in the sudden relief of intestinal obstruction without first removing the toxic contents above the obstruction. Since this cause of death is the most to be dreaded and one which often cannot be foretold, it follows that the further study of anesthetics and their effect on the liver is very desirable. At present there is no test available which gives anything but an approximate idea of the efficiency of liver function. Judging from statistics, Graham's suggestion of using iso-iodeikon and taking fifty per cent retention as an arbitrary standard of safety for operation without elaborate preparation is worthy of further study, since Graham was able to reduce his mortality in simple cholecystectomy from six per cent in 216 cases to four-tenths per cent in 224 cases. However, the number of cases is too small for absolute conclusions to be drawn. In my personal experience of over two thousand operations upon the biliary tract, I believe that gas-oxygen-ether using the modern apparatus is the safest in those cases which permit a general anesthesia. In extremely emaciated and debilitated patients, using such preventive measures as time allows, the anesthetic will of course be local or block. Using the position which I do, I do not consider spinal anesthesia safe in its present stage of development.

Anesthesia in the elevated head and trunk position does not differ from anesthesia in any other position except that when the patient is permitted to assume a more level position, the depth of anesthesia should be slightly increased to provide against the patient coming out when the head is lowered. For this reason the anesthetist should be familiar with the steps of the operation and should take precautions accordingly. The air is let out of the bag when the intraperitoneal part of the operation is completed and as the surgeon prepares to suture the abdominal wall.

A REPORT ON EVIPAL SOLUBLE*

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Other and more comprehensive reports have been published on evipal soluble as an anesthetic but it is of interest to us to consider it from our own experience.

To date evipal soluble has not been administered by the nurse anesthetist at Methodist Hospital but a nurse anesthetist has been present at practically every administration. A record has been kept of the blood pressure, pulse, respiration, induction time, reaction time, et cetera. The time may come when evipal will be given by the

* Read at a meeting of the Fort Worth, Texas, Association of Nurse Anesthetists.

nurse anesthetist as avertin is, but so far it has been given here by a physician because of the fact that it is considered a noncontrollable type of anesthetic although, being detoxicated so rapidly, it very closely approaches the controllable type.

Evipal for use as an anesthetic is furnished by the manufacturer in the form of its sodium salt, evipal soluble, one of the ever-increasing barbiturate family. It is supplied as a powder in ampules of one gram each. The powder is readily soluble in water but the solution not being stable must be freshly prepared. The contents of one ampule, or one gram of powder, dissolved in 10 c.c. of distilled water gives a 10 per cent solution, each c.c. containing 0.1 gram of the drug.

The dosage of evipal soluble is based primarily on the weight of the patient but other things must also be taken into consideration, chiefly the age and general condition of the patient. A method which has proved satisfactory is the use of 0.06 c.c. as an index, the patient's weight in pounds multiplied by 0.06 giving the dosage. Thus a patient weighing 150 pounds would receive 9 c.c. or 0.9 grams as a maximum dose. This, however, might be too large a dose for an aged patient or for one with renal or cardiac disease, dehydration, cachexia or obesity, or it might be too small a dose for an alcoholic or highly nervous patient. The reaction of the patient is the guide and care must be taken not to exceed the maximum dose and never to exceed 15 c.c. or one and one-half grams.

Technique: Shortly before the time for administration one gram of evipal soluble is dissolved in 10 c.c. of sterile distilled water, making certain that all the powder is dissolved. This is most conveniently done by drawing the water into a syringe and injecting it into the ampule containing the powder. By aspiration and reinjection into the ampule a clear solution is readily obtained. If undissolved particles remain after considerable agitation of the solution it should be discarded, as the powder has probably been exposed to air and has decomposed.

Because of the short duration of anesthesia produced by evipal soluble and the short induction period, it has been found preferable to prepare and drape the patient before injecting the anesthetic. As one of the veins of the forearm is usually chosen for the injection, the arm is placed on an arm board, a tourniquet is placed ready to be tightened and an alcohol sponge left over the site of injection during the preparation. When all is ready the needle is inserted into the vein and the patient instructed to count slowly. The first 4 c.c. of the drug should be injected at the rate of one c.c. in fifteen seconds. The remainder of the dosage may be given at the rate of one c.c. in ten seconds. Regardless of the maximum dosage ascertained by the index above described, the reaction of the patient must be watched closely. Anesthesia is usually complete in one minute but if the drug is given too slowly it may be detoxicated as given and anesthesia never obtained. If given too rapidly, respiratory arrest may occur but this, however, is rarely fatal. As the drug takes effect the patient counts more and more slowly. If the counting started slowly, a count of nine is seldom passed; if rapidly, a count of nineteen. The respiration is not materially altered, although as muscular relaxation takes place the jaw drops forward and must be supported as in other methods of anesthesia. Slight twitching of the face muscles and some generalized movements may occur but usually the patient goes very quietly to

sleep. Satisfactory anesthesia may be obtained before the maximum dose has been administered. In this case the needle may be left in the vein if desired, and a small amount given from time to time to keep the patient asleep. The sleep induced by evipal soluble closely resembles a natural sleep. The blood pressure may drop 15 to 20 millimeters but returns to its former level when the patient awakens. The pulse is usually unchanged. The anesthesia lasts about twenty minutes but may be prolonged by injecting a small amount of the drug as before described. The surgical procedure completed, the patient awakens as from a natural sleep, usually by the time he leaves the surgery if premedication has not been used.

In the beginning we did not use premedication with evipal soluble, because of the belief that it would increase the danger of respiratory depression, but as we have become more familiar with the drug we have come to the conclusion that its effects are more satisfactory if premedication is used. We commonly use ¼ grain of morphine sulphate, occasionally ⅙, with $\frac{1}{150}$ grain of atropine sulphate. With this preparation the anesthesia is more satisfactory and the patients awaken in bed, thereby being spared the confusion of awakening on the way to the ward and being moved about while in a confused state of mind. Also the effect of the morphine is usually greatest when postoperative pain would first be felt. Barbiturates should not be used with evipal soluble.

Because of the brief period of anesthesia produced by evipal soluble only short surgical procedures should be undertaken with it. If, however, the operation requires a longer anesthesia than was expected, it has been found satisfactory to supplement evipal with nitrous oxide, ethylene or ether.

We have used evipal soluble in seventy-three cases as follows:

Appendectomy	26
Dilatation and curettement	11
Hemorrhoidectomy	6
D. & C. and hemorrhoidectomy	3
D. & C. and radium insertion	1
D. & C. and cauterization of cervix	2
Hemorrhoidectomy and perineorrhaphy	1
Biopsy and cauterization of cervix	1
Repair of rectocele	1
Incision and drainage of abscess	1
Drainage of abdominal abscess (One patient died the third day postoperative)	2
Rectal dilatation	1
Pelvic examination	1
Cystoscopy (Supplemented with gas)	1
Fistulectomy	1
Tonsillectomy	2
Dilatation of esophagus	2
Freeing postoperative adhesions	1
Removal of tumor, thigh	1
Reduction of fracture	3
Reduction of dislocation	1
Ruptured gastric ulcer (Surgery continued with gas-ether)	1
Appendectomy and salpingectomy (Supplemented with ether)	2

In one case of reduction of fracture the patient resisted but had no memory of pain. In this series two deaths have occurred. One moribund patient was given evipal for an ileostomy but expired when the evipal was administered. One patient died on the third postoperative day following incision and drainage of abdominal abscess.

The usual induction time has been one minute or less, the average surgical time sixteen minutes and the reaction time thirty to forty minutes. Reaction has rarely been accompanied by nausea or excitement. The age of the patients has varied from three to sixty

years. No untoward effects have been observed (the two deaths in the series could hardly be attributed to the anesthetic, one patient being moribund on administration and the other dying on the third postoperative day, the cause of death being attributed to peritonitis).

It is always advisable to have stimulants at hand. The complications are usually respiratory and we therefore have coramine, metrazol, carbon dioxide and oxygen available but so far they have not been needed. We have used an airway in a few cases. Ephedrine should be available in case an extreme drop in blood pressure should occur. One clinic reports the use of ¾ grain of ephedrine subcutaneously before administering evipal.

Evipal soluble has been used experimentally in fractional doses for long surgical procedures, and also for induction followed by a supplementary anesthetic for such cases, but this has not been found to be satisfactory. Dr. James T. Gwathmey has reported a series of cases at City Hospital, Welfare Island, New York City, in which evipal was given rectally with considerable success. The technique of administration is similar to that of avertin. The dosage index is 0.02 as compared to 0.06 for the intravenous method. The 150 pound patient whose maximum dose is 0.9 c.c. for the intravenous method would then receive 30 c.c. rectally as a maximum dose. Dr. Gwathmey reports that this dosage usually gives sufficient anesthesia for minor cases but must be supplemented for major surgery. Morphine is used as a premedicant. Sleep is usually induced in four or five minutes. Reaction time varies from immediate to four or five hours. Acting only on the sensory nerves and not on the heart in any way, it is considered a safe basal anesthetic.

Dr. J. McNelis of Charleston, West Virginia, has reported a series of one thousand cases in which evipal soluble was used intravenously for minor surgery, the major portion being mining and industrial injuries, including 250 fracture cases. Twenty appendectomies were reported but he does not recommend the use of evipal for major surgery. After the first two hundred cases Dr. McNelis discontinued the taking of the blood pressure, feeling that the changes were too slight to warrant the extra procedure. In this series he reports a few minor complications but no deaths.

Another report covers the use of evipal soluble for thoracoplasties, for which type of surgery it was found most satisfactory, the authors believing that following its use postoperative shock, as well as the death rate decreased.

Indications for use:

Evipal soluble has proved most satisfactory for short surgical procedures. For reduction of simple fractures and dislocations, hemorrhoidectomy, curettage, implantation of radium, incision and drainage of abscess, painful dressings and manipulations, et cetera, it is valuable because of the absence of post-anesthetic nausea, restlessness and headache. For office surgery it is satisfactory for the same reasons.

Contraindications:

As yet definite contraindications have not been established for the use of evipal except in case of extreme liver injury, as evipal soluble is detoxicated in that organ. Evipal soluble, as any other anesthetic, is used with great caution in the aged, cachectic, seriously ill, anemic or toxic patient. The majority of deaths reported has been attributed

to some coexisting condition such as advanced liver, respiratory or cardio-renal disease, peritonitis, sepsis or uremia.

Conclusions:

Evipal soluble is proving a valuable addition to the list of anesthetic drugs. In capable hands and in its own field it fills a long recognized need for an anesthetic for minor surgery. It is not unpleasant to the patient, and while supplying the necessary anesthesia for minor surgical procedures has a short reaction period with practically no unpleasant after-effects. The aftermath of a general inhalation anesthetic is often far greater than the minor surgical work warrants. The longevity of evipal is still to be proved but it has practically passed the experimental stage and will probably find a permanent place in the list of elective anesthetics.

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ANESTHESIA IN ORAL SURGERY*

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The dental surgeon's field of operation is entirely different from that of the general surgeon and is associated with many difficulties. The dentist must contend with tooth and bony structures as well as soft tissues, and the oral cavity and surrounding structures upon which the dentist operates are highly vascular. This vascular area, made up mostly of small arteries and veins, presents a bloody operative field and because of their small size it is quite impossible to clamp them, not to mention the flow of saliva and a mobile lower jaw which must be guarded to prevent a mechanical obstruction to breathing.

The tongue, unless there is complete relaxation, interferes with the operative field by causing mouth packs to be disturbed. These mouth packs, which consist of a layer of absorbent cotton placed in gauze, prevent the ingress of air through the mouth, as well as fragments of teeth, fillings or other foreign bodies from being aspirated or swallowed. They prevent blood from going down the throat and if properly placed prevent a relaxed tongue from dropping back into the pharynx. If the dentist fails to insert a properly placed mouth pack, I firmly believe the anesthetist should mention the possibility of the patient becoming as-

* Read April 14th, 1937, at the fourth annual meeting of the Ohio Association of Nurse Anesthetists, held in Columbus, Ohio.

phyxiated by the intake of foreign bodies, blood and saliva. In the removal of deeply embedded third molars it is sometimes impossible to prevent blood from getting down the throat even though an aspirating tube is used, as this field is so far back that it is lateral to the anterior pillars.

A properly placed mouth pack is an adjunct to a smooth anesthesia. A mouth pack that is correctly placed rests on the dorsum of the tongue and posteriorly to the anterior pillars. Because of the slight movement to and fro of the anterior pillars it is quite possible for foreign bodies and blood to get by these packs and upon inspiration be sucked into the pharynx. A mouth pack that would occlude the fauces would interfere with free breathing. Knowing then the requirements of the oral surgeon and if there is no contraindication, the anesthetic and the method of administering it should be so chosen that he may operate with the least amount of interference. To keep the field of operation unobstructed by anesthetic equipment, it is necessary to maintain anesthesia by some method other than through the mouth. If the apparatus is available and there are no contraindications, nitrous oxide, plus a small amount of ether for relaxation, is still the favorite of most oral surgeons for hospital cases. Nitrous oxide is given as a sequence and as the maintenance stage is reached, sufficient ether vapor is given through the nitrous oxide machine for relaxation. This does not mean that the nitrous oxide anesthetic should be shrouded with ether.

This combination given through the nasal inhaler does not interfere in any way with the operative field unless operations are performed on or under the upper lip. Where a nitrous oxide machine is not available, ether by the open drop method may be used to anesthetize the patient, then ether vapor from the aspirating machine or bellows passed through tubes through the nose or pharynx. Intranasal or intrapharyngeal insufflation may be used to maintain anesthesia.

For the resistant type of patient and where the electric cautery is to be used, avertin used as a base plus a small amount of nitrous oxide is an ideal combination for hospital patients. It is of particular value in the reduction of jaw fractures where an anesthetic is indicated, and in cases of trismus where the jaws must be opened, because it relaxes the muscles of mastication.

You are familiar with its contraindications, and one of the disadvantages is that recovery may be prolonged from one to four hours and a nurse should be in constant attendance to prevent asphyxia, which might occur because of the relaxation of the jaws and tongue.

In oral surgery there is no advantage in keeping the patient absolutely quiet or asleep following the completion of an operation. It is, however, a disadvantage because of bleeding. The sooner the patient is awake and the reflexes restored, the quicker he is able to clear the mouth. With the exception of the resistant type and where the cautery is used, the noncontrollable or basal anesthetics, in my opinion, cannot approach the inhalation anesthetic for safety and efficiency.

Evipal as an intravenous anesthetic may have one advantage over nitrous oxide in a singular type of case, Ludwig's angina or phlegmon of Gensoul, where there is a deep-seated infection in the floor of the mouth and neck, with impaired respiration due to pressure from within on the trachea and swelling of the tongue. Because of

rigidity of the muscles and asphyxial symptoms from inhalation anesthetics, we hope evipal will fill our needs for a safer anesthetic in these grave cases.

For minor oral surgery, such as the removal of teeth (embedded teeth excepted) in hospitals nitrous oxide and oxygen is without doubt the best anesthetic because of its safety, quick induction and elimination. Yet most anesthetists dislike giving it or at least seem to have more difficulty with it. It is not all the anesthetist's fault, however, as any dentist who is not familiar with operative technique while the patient is under a general anesthetic, may do much to interfere with a smooth anesthesia. He may not have a correctly made and placed mouth pack, which would allow breathing through the mouth, or if operating on the lower jaw, he may be pushing the pack down, causing interference to free breathing. The best of cooperation is none too good for operations in the mouth. Because of the open or partly open mouth, the movable tongue and lower jaw and the fact that the anesthetic must be forced through the nose, anesthesia for oral surgery is one of the most difficult tasks. The hospital anesthetist is more familiar with and called upon more frequently to give nitrous oxide for operations other than oral surgery, where a face inhaler is used and the gas given under low pressure. In oral surgery the method is entirely changed, using the nasal inhaler, with high pressure to force the gas through the nose. Nasal obstructions and air going through the mouth add to the difficulty. If the anesthetist is seated there is a strong tendency to pull the nasal inhaler over the nose, which closes the alae, and if the mouth pack is properly placed, the patient soon shows asphyxial symptoms.

Premedication, which is used routinely in the hospital, should make the administration of nitrous oxide less difficult in hospitals than in dental offices. So far I have attempted to suggest the type or choice of anesthetic for oral surgery in the hospitals.

I have also been requested to discuss nitrous oxide, the anesthetic in which I am most interested and with which I am most familiar. Nitrous oxide has been used for the removal of teeth and other minor oral surgery for ninety-three years. Nitrous oxide rightfully belongs in the dental field because of its discovery by a dentist and the fact that it has been used more frequently by the dentist. It is needless for me to say that the mortality rate has been exceedingly low, even when it was used without oxygen. In the early days without the use of oxygen the patient was saturated and the mask removed, consequently the operations were limited, but for many years, with the use of oxygen and the modern machine, the operator has not been necessarily hurried.

Anesthesia for dental and oral surgery in the office. Operations are performed on ambulatory and usually good risk patients—those patients who are able to come to the office and perhaps walk up a flight of stairs. Some cases, such as impactions, cysts, tumors, et cetera, require a long anesthesia, but the majority of cases are completed in ten to fifteen minutes. A poor risk patient in an office may be a fair risk in the hospital, because of preoperative and postoperative care. The dentist as a rule must take his patients, as it were, from the street, without previous examination or history. He must be a very close observer of clinical diagnosis. Every patient is scrutinized for objective symptoms of cardiac diseases. The usual remark for those who are fearful of a general an-

esthetic is, "Doctor, I have a bad heart." If the patient complains upon slight exertion, such as walking across the room, or there is blueness of the face and lips, or swollen joints, his cardiac power is diminished and a careful history should be obtained from the patient and his physician.

The thyrotoxic, hypertensive-anginal type may be carried through safely if proper premedication is used. After administering several thousand nitrous oxide anesthetics for dental and oral surgery as well as anesthetizing many patients for rectal surgery, I can truly say that the prostration type of patient is our greatest risk. They have pallor, very slow pulse, no fear of the anesthetic, do not care whether or not they die, every movement is slow and deliberate, the skin is clammy, the blood pressure is very low and the muscles are flaccid. This prostration is the result of some systemic wasting disease, the nature of which may be unknown to the patient.

Exhaustion or prostration may also be produced by improper administration of the anesthetic, causing anoxemia or an over-production of carbon dioxide, or surgical shock. It has been my experience that with cases of this character, there is extreme pallor and contracted pupils. Even though oxygen is the specific antidote to nitrous oxide, prompt medication with some reliable heart stimulant should be given.

It has recently become a practice with some anesthetists to add definite quantities of carbon dioxide to the anesthetic mixture with or without the employment of rebreathing. Much has been written by physiologists and anesthetists as to the advantages and disadvantages of the administration of carbon dioxide or a mixture of carbon dioxide with oxygen, known as carbogen. I quote from Dr. R. M. Waters, Department of Medicine, University of Wisconsin. "The use of carbon dioxide involves a very delicate physiologic balance which may be thrown in one direction or the other in a very short space of time and to the severe detriment of the patient as well as to the embarrassment of the surgeon. My impression is that the sum total results of the physiologist's recommendation of the use of carbon dioxide as an adjunct to anesthesia, has so far been one of harm rather than benefit to surgical anesthesia."[1]

I also quote from the late Dr. McKesson, whom the most of us knew personally, and one whose knowledge and experience of anesthesia was respected by all. "In dental cases, there is no danger of accumulating too much carbon dioxide, but there is danger of giving too much carbon dioxide when it is delivered from a tank of this gas.

"Administration of carbon dioxide tends to mask the respiratory signs of oxygen want by stimulating respiration when the patient needs more oxygen. This is particularly true when this gas is not accumulated by rebreathing, but delivered from a tank.

"Carbon dioxide does not take the place of oxygen in any sense, but rather augments the anesthetic effects of nitrous oxide. It possesses some anesthetic properties in concentrations of more than ten per cent. For this reason a patient deeply anesthetized should be given oxygen, not carbon dioxide. And while administration of carbon dioxide under twenty per cent concentrations stimulates respiration, it often fails to do so in deep anesthesia or in the absence of enough oxygen to lighten the narcosis."[2]

My conclusions are that since nitrous oxide must be given for dental operations under pressure, we do not as a

rule have an over-production and accumulation of carbon dioxide. The modern nitrous oxide machine is equipped with a rebreathing device so that it is possible to retain certain amounts of the patient's carbon dioxide. Therefore carbon dioxide in tanks is not a necessary adjunct for short anesthesias, unless its use is confined to induction, before the patient has accumulated enough carbon dioxide to hasten breathing.

Cyanosis and asphyxia.—Nitrous oxide is a gas that enters and leaves the system with the rapidity of oxygen. No one has been able to demonstrate that nitrous oxide forms any combinations with the fluids or tissues of the body or that it affects any organic functions. What then are the hazards of nitrous oxide anesthesia? When it is not given with sufficient oxygen, or improperly given, it may cause anoxemia, cyanosis and asphyxia. How may these effects be prevented, or corrected when they occur? Since oxygen is the specific antidote for anoxemia, special attention should be paid to oxygen need. Rate and depth of respiration, eye, and musculature signs are cardinal signs of nitrous oxide anesthesia. Their rank of importance must place respiration first, eye second, muscular third and cyanosis of the least importance, unless accompanied by asphyxial symptoms.

Anoxemia, cyanosis and asphyxia are not synonymous terms. Cyanosis, while it has saved more lives than all other signs, on the contrary, where this sign has been the paramount danger signal, it has resulted in a very unsatisfactory and irregular anesthesia in plethoric patients and a very dangerous one in anemic patients.

Cyanosis is present to a certain degree in all nitrous oxide anesthesias except in the anemic patient. Cyanosis in patients with normal respiration, normal pulse and eye signs does not have any harmful effect. An anemic patient becomes pink in profound anesthesia and fails to show cyanosis even in the fourth stage. The nasal inhaler pressing on the lips will cause a blueness that may be mistaken for cyanosis.

The greatest danger in any general anesthetic is asphyxiation. This applies to all anesthetics. It is by far our greatest risk, since our patients are ambulatory. Dr. McKesson says: "Asphyxia is a broad term, including any grade of respiratory inadequacy from any cause, with a resultant inadequate supply of oxygen, with or without accumulation of an excess of carbon dioxide or other products of metabolism. Anoxemia is a more specific term relating to an inadequate supply of oxygen only."[3]

In dental anesthesia there is usually not an over-production of carbon dioxide; in most instances asphyxiation is the result of obstruction of the airway. The nose piece may close the alae, the mouth packs may be pushed back, there may be pressure on the mandible, or incorrect sitting posture. It is possible to have anoxemia with a clear airway because of the concentration of the anesthetic. Opening the airway and the administration of oxygen in either anoxemia or asphyxia, are indicated. Nitrous oxide should not be given unless there is an emergency oxygen valve available.

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[1] A. D. A. Journal, November, 1935—Dr. R. M. Waters.

[2] A. D. A. Journal, May, 1934, Dr. McKesson, "General Anesthesia."

[3] A. D. A. Journal, May, 1934, Dr. McKesson, "General Anesthesia."

ANESTHESIA IN THORACIC SURGERY*

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It was not until comparatively recent times that it was considered possible, because of the negative intrathoracic pressure, to open the thorax without disastrous results. One of the outstanding achievements of the past twenty years is the surgical treatment of tuberculosis and other pulmonary lesions. In pulmonary tuberculosis the standard methods of today all aim at immobilization of the diseased lung. Various procedures are used toward this end, know as "collapse therapy."

The first procedure is pneumothorax, which is artificially produced by the introduction of gas or air into the pleural space. Supplementary to artificial pneumothorax, phrenectomy is frequently done to cause paralysis of the corresponding half of the diaphragm, thus aiding in bringing about pulmonary rest. In the presence of adhesions which firmly fix sections of the lung to the pleura, a pneumolysis or cutting of the adhesions with a cautery, is done to free the lung. Local is the anesthetic of choice in these cases. About 5 per cent of the cases, however, do not respond to the above treatment, and thoracoplasty becomes necessary to obtain a complete collapse of the lung. This operation consists of the removal (sometimes in stages) of several ribs near the cavity, permitting the chest wall to be compressed. Experience has shown that the patients responding most favorably to thoracoplasty are those between the ages of fifteen and forty-five years, and free from diabetes mellitus, severe nephritis or pregnancy.

In preparing a patient for thoracoplasty fluids are forced the day before operation, because tuberculous patients have a tendency to perspire profusely and lose great quantities of body fluid. Three grains of sodium amytal are given one hour pre-operatively, followed by 1/6 to 1/4 grain of morphine sulphate and 1/100 grain of atropine sulphate one-half hour before operation. On arrival at the operating room most of the patients are drowsy and disinterested.

The position on the operating table is very important. Emphasis should be laid on comfort, and ease of respiration. The anesthetist should have free access to the face and head, and the patient should be placed in position before the anesthesia is started. The patient is placed on the unaffected side, with a pillow under the kidney region and another between the flexed thighs. The desired position is maintained by the use of braces on each side of the chest and a strap around the knees. The arm of the affected side is extended over the edge of the table and the other arm flexed toward the head of the table. If the patient has been expectorating an excessive amount of sputum daily, the head of the table is slightly lowered to counteract the danger of aspiration.

The choice of the anesthetic is extremely important. The depth of narcosis should be maintained at an even level, and the cough reflex should not be abolished. The contending factors involved in the choice of an anesthetic are: abolition of pain and distress; avoidance of shock; avoidance of aspiration of secretions.

We have found nitrous oxide and oxygen a satisfactory anesthetic with

the previously mentioned premedication. The modern gas machine with the soda-lime filter attachment has proved distinctly advantageous in this type of surgery. Nitrous oxide being a non-irritating gas, excessive secretions are not present. In administering the anesthetic, the important point to remember is that the patient's pulmonary function is already affected by disease. The vital capacity is decreased, and a smooth induction and the maintenance of anesthesia without respiratory effort, are necessary. In our experience avertin has proved unsatisfactory in thoracoplasties, because it delays the immediate return of the reflexes and the patient is therefore unable to expectorate mucus, blood or sputum immediately following operation.

During the operation the anesthetist should observe carefully the depth of respiration, whether or not it is labored, the rate and quality of pulse and the color of the skin, and whether or not the patient is perspiring freely. During the resection of the ribs the pulse rate often increases, from 100 to 120, or from 120 to 160, and the volume decreases. The respiration increases in rate. A retention enema consisting of one pint of warm water is given to increase the body fluid, after the resection of the ribs. Very rarely have we found it necessary to resort to drug stimulation. At the completion of the operation tight dressings are applied over the wound and the patient is placed in a warm bed, on the affected side.

Postoperatively the patient is given an intravenous infusion of 5 per cent glucose in saline, and ¼ grain of morphine sulphate every four hours to control pain and restlessness. Blood pressure and pulse are taken and recorded every half hour, and fluids and food are given as tolerated. Oxygen is administered by nasal catheters for cyanosis when bilateral disease is present. Because many of these patients go into shock postoperatively, the foot of the bed is raised routinely The result in 70 per cent of these cases is favorable. The causes of death are heart failure, tubercular pneumonia, tuberculosis spreading to the other lung, and wound infections.

For operations such as lobectomy, pneumonectomy, cyst or tumor of the lung, the cough or laryngeal reflexes must be obliterated. When there is a copious discharge of sputum and mucus from the bronchi, the endotracheal method of anesthesia is preferred. Otherwise a tight fitting face mask, using a modern gas machine with soda-lime filter, is satisfactory. A suction apparatus should always be within reach of the anesthetist. Avertin (80 milligrams per kilogram) with ⅙ grain of morphine sulphate and 1/100 grain of atropine, supplemented by nitrous oxide plus oxygen, has proven satisfactory and has been popular in this institution. An intravenous infusion of 5 per cent glucose in saline is started before operation and continued throughout. The slightest change in the condition of the patient should be reported to the surgeon at once. Blood transfusion is given routinely at the close of the operation.

The control of differential pressure is of special importance in thoracic surgery. If greater pulmonary expansion is needed we maintain positive pressure by increasing the flow of gases. This is necessary when the pleura is opened in order to prevent collapse of the lung. In such instances the amount of nitrous oxide needed is remarkably small and vomiting during differential pressure anesthesia is extremely rare. Positive pressure is a great help to the

surgeon, because dyspnea, shock and mediastinal displacement are relieved. The dreaded pneumothorax is avoided and uninterrupted recovery is more likely. In many cases differential pressure prevents infection from spreading throughout the entire pleural space. In injury to the lung, even small punctures are easily recognized by the bloody foam expelled under positive pressure, and in larger wounds blood clots and pieces of tissue are forced out.

The advantages of endotracheal anesthesia in thoracic surgery are:

1. Operations in which difficulty may be experienced in maintaining a clear airway.
2. In the presence of a perfect airway no strain is placed on the patient's respiratory mechanism, and muscular relaxation occurs at a lighter level of anesthesia.
3. An accurate anesthetic dosage is possible.
4. The entry of blood into the trachea can be prevented.
5. If necessary, suction can be used more easily.

The disadvantages of endotracheal anesthesia are:

1. Some delay may be encountered in inserting tube.
2. Occurrence of post-operative sore throats from the irritation caused by the tube, if not inserted carefully and prevented from moving.
3. Deeper anesthesia is necessary for insertion of tube unless area is previously cocainized.

Statistics show that under the improved methods of treating thoracic diseases, the mortality rate has been greatly reduced. The earlier the treatment of these diseases is undertaken, the greater is the probability of success.

Addendum

Since this paper was written we have instituted the use of cyclopropane in this institution for all thoracic operations. In patients with pulmonary lesions better results can be obtained with cyclopropane than with other anesthetics. It has proved more desirable than nitrous oxide-oxygen for the following reasons: less preoperative medication is needed; the induction of anesthesia and recovery are rapid; it affords quiet breathing; the pulse rate remains nearly normal, depending upon the depth of anesthesia; patients do not perspire as with other inhalation anesthetics; and the endotracheal technique is facilitated. Cyclopropane is valuable because of its potency, low toxicity, and the large amount of oxygen which may be used with it. The only disadvantage is that the Bovie unit for coagulation cannot be used with cyclopropane.

THE SURGEON AND HIS ANESTHETIST*

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The first anesthetic ever given for me for a major operation was administered to an Eskimo woman in the most northern hospital in the world, with a gold miner as an assistant and an ex-bartender as the anesthetist. That

* Read at the fifth annual meeting of the Pennsylvania Association of Nurse Anesthetists, held at Buck Hill Falls, Penna., June 2, 1937.

was over twenty-five years ago. In performing some thirty thousand operations I have had anesthetics administered by every type of professional anesthetist, male and female, good, bad, and worse. In the past twenty years I have seen the profession of the nurse anesthetist advance from a meager and inauspicious beginning to its present state of high respectability and manifold efficiency, to take its place among the finest callings open to women. I have no patience with those who would drive the nurse anesthetist from the field. They are on the wrong track and I am sure will get nowhere and should not.

I have been asked to speak on the subject of "The Surgeon and his Anesthetist." Perhaps some of you will write some day on "The Anesthetist and her Surgeon." We are in close cooperation — an intimate team, and we must stick together, consequently we are privileged to write about each other and discuss each other as intimately and perhaps as personally as we like, but do we always work with complete and mutual understanding? Do we always work together as closely as we should? Yes, almost always, but not as thoroughly so as no doubt we should. The stress of the operating theater, the great tension under which we work, the completely unique type of human endeavor in which we are engaged, with all its attendant and manifold anxieties, frequently stand in the way of our sufficiently appreciating the position, the responsibilities and the viewpoint of each other. Our faults, such as they are, are common to both. Both of us at times are impatient, intolerant, perhaps quite inconsiderate. But the surgeon is, far and away, the greater offender. When exasperated he often, too often no doubt, speaks his mind, and blows off excessive steam to his temporary relief, perhaps, but surely never to his permanent benefit. The anesthetist on the other hand must keep still. Ethics, an often badly abused term, compels her to repress her emotions and say nothing.

What then do we expect of each other and by the same token, what do we not expect, or at least most decidedly do not want? The surgeon expects, and usually finds in his anesthetist a keenness of mind, an alert intelligence, a loyal, faithful, self-effacing, efficient devotion to the job in hand rarely equaled in any other field. The anesthetist's function is to render her patient insensible to pain by skilful handling of the anesthetic, to the safe administration of which she is devoting her life, and this obligation she usually meets.

And what does the anesthetist expect and none too frequently get? I believe I know, yet in twenty-five years of an active surgical practice I do not recall ever hearing an anesthetist speak of it, at least out loud. I believe she desires of her surgeon patience, consideration, and an understanding of the multitudinous and varied difficulties of her job. She wants encouragement, helpful and constructive advice and criticism when she is wrong and a word of approbation when she is persistently doing what she and every one else in the operating room knows to be an especially fine piece of work. She wants, in other words, cooperation, and so does the surgeon . . and when these two have a life in their hands, as they very frequently do, and the man on the table is as near death's door as he ever will be until his last great day, that term, "cooperation," has a significance not attached to it in any other field of endeavor the wide world over.

Some time ago I was asked to speak to a group of nurses on the subject of

"How as a Surgeon do I Judge a Nurse." In listing the qualifications I felt most essential, I placed at the head, "alertness" and this would apply equally well as the most important of essential qualities of the nurse anesthetist. I love a wide-awake, on-her-toes, quick-thinking, alert type of nurse anesthetist, one who reads books and journals devoted to anesthesia, who attends meetings and clinics and hospitals and studies the methods and technique of others and is abreast of the times constantly, and once in awhile a jump or two ahead. She is the kind all surgeons like. The anesthetist should be kindly and sympathetic and interested in each patient, almost as if she were a relative. She should visit the patient before and after the operation, if she has time. She should smile a lot, in spite of the frequent and unparalleled adversities of the operating room. A truly great nurse anesthetist would have all the qualities set forth in Kipling's "If." This is a large order but I know anesthetists who fill it—in fact I have two such in my own hospital.

We have witnessed great changes in the administration of anesthetics in the past twenty years. New drugs have come into use, many to remain but a short time. Apparatus has been improved, and while it is becoming more complex, yet it has greatly facilitated the giving of anesthetics. It is a far cry from the old marine sponge and mask first used by Morton in 1846, and which now reposes in the museum of the Massachusetts General Hospital, to the modern anesthetizing apparatus, costing some eight or nine hundred dollars, with all its gadgets and gauges, resembling the instrument board of a modern transport airplane.

So far as the different anesthetics and their relative efficacy is concerned, I would sum up our conclusions in the past twenty years in the Geisinger Memorial Hospital about as follows:

In the first place, open drop ether still has a definite place. Nothing has ever been produced to excel it, particularly so far as safety is concerned, but it has its disadvantages. It is used only occasionally at Geisinger Hospital.

Ethylene, which we used for years and liked very much, has been discarded and replaced by cyclopropane, which is much more satisfactory in that it produces deeper anesthesia, in a shorter space of time, and has the overwhelming advantage that it can be administered with a high percentage of oxygen. We are using it more and more and believe it is an anesthetic which has come to stay unless replaced by something very much better. Practically all of our ether inductions are started with cyclopropane and many operations are completed entirely with it.

Spinal, which was very popular with us, and which we have used some four thousand times, is gradually being replaced except for operations well below the level of the umbilicus. For operations on the bladder, the pelvis, the extremities, the perineum, and the lower rectum it is an anesthetic par excellence. No one can question its safety in my presence. We studied sometime ago a parallel series of four thousand consecutive operations which were performed below the diaphragm, half with ether and half with spinal. In the spinal series the mortality was less, and during the first twenty-four hours was infinitely lower. The operating room mortality was incomparably better for the spinal series. However, this anesthetic must not be used routinely. From the surgeon's standpoint it is none too satisfactory in the upper

abdomen unless given in too massive doses.

We are using with caution pentothal sodium intravenously, and like it particularly in the short operations and especially well in the reduction of fractures and dislocations. Nitrous oxide is always a satisfactory anesthetic in short procedures, and as an induction for ether. It is an excellent anesthetic preceded by a basic barbiturate, in thyroid work.

We feel that rectal anesthesia with avertin and similar drugs has a limited field, except in operations about the jaw, trachea, larynx, et cetera, when it is the desire to have the anesthetist out of the way. In our obstetric department rectal anesthesia, Barb-Eth-Oil, 60 to 80 ccs, and preceded by 7½ grains of nembutal is proving satisfactory.

Local anesthesia, we feel, should be relegated to the limbo of forgotten things. To subject a patient to an operation, say for a hernia, and to the anxiety and mental strain of repeated innumerable needle punctures when he can be rendered totally insensible to pain with a little gas or spinal is, I feel, inconsiderate, yet volumes have been written about local anesthesia. There are today too many excellent general anesthetics, which are entirely safe, easily given and free from untoward results, to bother with local anesthesia with its attendant psychic effect, which may be quite unknown to the surgeon, yet remains as a ghastly memory with the patient as long as he lives.

I was trained at the Mayo Clinic at Rochester, Minnesota, where, for many years, all anesthetics have been given solely by nurses. For twenty-two years at the Geisinger Memorial Hospital all of our anesthetics have been given by nurses. I have come to depend fully and implicitly on these highly trained, experienced, and capable young women. They are as important to us as any member of the staff and as invaluable. It seems that only at times such as this that we pause long enough to thoroughly appreciate how much the nurse anesthetist has meant to the doctor, to the surgical patient, to the hospital, and to the general and progressive advancement of the science of modern surgery.

AVERTIN—PREFERRED*

MARION SUHRHOFF

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Since the discovery of avertin in 1923 the medical literature both here and abroad is voluminous with reports on this anesthetic agent. It is not my purpose to review any of these reports, but rather to relate my experience with avertin on one thousand and forty cases at the Midwood Hospital.

The avertin solution is prepared according to the instructions given by the manufacturer, which are no doubt familiar to all of you. In co-operation with Dr. August Spiegel, who has had extensive experience with avertin both here and abroad, we have devised a different scale of dosage than that usually employed. Through individualization of cases, dosages of 150 milli-

* Read at the fourth annual meeting of the New York Association of Nurse Anesthetists, New York City, May 20, 1937.

grams per kilogram of the 3 per cent solution are generally given. On occasion, depending on the physical condition of the patient, dosages of as high as 180 milligrams per kilogram have been administered. Deviation from the usual basal dosage is made because of a distinct preference for a smoother and higher percentage of complete anesthesia. In my series complete anesthesia has been obtained in about 85 per cent of the cases. Open drop ether is employed in those requiring supplementation. There are some surgeons who insist, for various reasons, on basal dosages. There are some patients whose physical condition makes it inadvisable to use anything but basal dosage. Liver disease, bilateral kidney impairment and rectal lesions are considered absolute contraindications to the use of avertin. Modification of dosage is indicated in the elderly, cachectic, the dehydrated and the very obese patient.

The preoperative preparation and premedication of the patient are not unlike the customary procedures in most hospitals. The patient is given a cleansing enema the night before operation, but this is omitted in emergencies, since the retained fluid would interfere with proper absorption of the avertin. Hypnotics are usually prescribed to insure a good night's sleep, which is highly desirable. One half-hour preoperatively one-sixth grain of morphine sulphate and $\frac{1}{150}$ grain of atropine sulphate are administered. The avertin is given with the patient in bed in Sims' position. The fluid is introduced through a lubricated catheter inserted three to four inches into the rectum, and the patient instructed to retain it and to take several deep breaths. In about ten minutes the patient becomes exceedingly drowsy and relapses into a deep natural sleep. There is generally complete relaxation in twenty minutes, at which time the patient may be transported to the operating room. The respirations are characteristic; corneal and conjunctival reflexes are abolished, and the pupils contracted.

The face may show a slightly bluish tint, but because of the accumulation of carbon dioxide in the blood the respiratory center is stimulated, the rate and volume of the respirations are increased, cyanosis disappears, and with very few exceptions the breathing remains normal during the entire operation. At first the blood pressure drops from 10 to 15 millimeters and the pulse becomes somewhat slower. If there is a decline of more than thirty millimeters in systolic pressure, one ampoule ($\frac{3}{4}$ grain) of ephedrine is given subcutaneously. In fact we often add ephedrine to the avertin solution just before administration as a prophylactic measure. During the operation the patient is watched carefully as to color, depth and frequency of respiration, tension and volume of pulse, and an airway is always used.

When the patient is returned to his room, he is watched in the same manner as the usual operative case. The nurse is instructed to inform the house resident and the anesthetist if any cyanosis, progressive increase of pulse rate, or shallowness of respiration occurs. Narcotics are never given until the patient has fully reacted. The duration of narcosis varies from about 8 to 15 hours. The patient awakens gradually without nausea or vomiting, and with a complete amnesia of preceding events.

Our series includes laparotomies, vaginal operations, herniotomies, coccygectomy, nephrectomy, thyroidectomy, tonsillectomy, plastic surgery of the face and cesarean section. In the

cesarean sections the condition of the mother was unaffected and in no instance was resuscitation of the infant necessary.

As a hypnotic for neurotic and alcoholic patients, and for convulsions such as in tetanus, avertin proves invaluable. One patient of full time pregnancy was admitted with a fractured skull after a severe fall, and was having convulsions. The patient had the usual treatment for relief of cerebral pressure with no success, during which time she delivered a normal living infant. The convulsions became continuous after delivery and avertin was given as a last resort. After the administration the patient had two convulsions, fell asleep and eventually recovered with no ill effects. This patient has had another normal pregnancy and delivery since then.

The percentage of fatalities has been markedly low inasmuch as we have had eight deaths out of the total number of cases mentioned, and none of these have been attributed to the anesthetic. Carcinoma was the cause of death in four patients, coronary thrombosis in two patients and cardiac failure in the remaining two.

Bronchial pneumonia developed in three patients, who recovered with no ill effects. Two patients had to be resuscitated during the stage of induction by artificial respiration and inhalation of carbon dioxide and oxygen, and one ampoule (1.5 cc) of coramine was given. The operations were completed with no further difficulties. One patient failed to react after twelve hours postoperatively, because of the fact that ¼ grain of morphine sulphate had been given before the patient had fully reacted. Although the symptoms appeared normal, as a matter of precaution intravenous saline 500 cc, with 5 per cent glucose and 5 cc of coramine and 1 cc of thyroxin were given, in addition to inhalations of carbon dioxide and oxygen, after which the patient reacted in fifteen minutes.

In conclusion: In my experience avertin has proved an excellent anesthetic agent, with the following advantages: Induction is smooth and uneventful. The patient is pleased because the psychic effects of the impending ordeal have been avoided, there is a complete amnesia lasting several hours, and the postoperative effects are not unpleasant. The surgeon is pleased with the anesthesia produced and is gratified by the patient's enthusiastic reports. I feel that avertin is definitely a step towards the ideal anesthetic.

SPINAL ANESTHESIA*

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It is almost axiomatic that our most proficient work is that which we enjoy, and conversely we like best that which we do with the highest degree of skill. Most of you by virtue of training and experience have attained such a high

* Read at the fifth annual meeting of the Pennsylvania Association of Nurse Anesthetists, Buck Hill Falls, Penna., June 3, 1937.

degree of perfection in the administration of inhalation anesthetics that it has become your favorite task. Like a pampered child you are apt to underestimate and excuse its shortcomings and to minimize the virtues of its competitors. I have chosen, then, to speak to you about intradural anesthesia with a dual purpose: to present its virtues and consequently awaken your interest and enthusiasm for it, and thereby make for more efficient spinal anesthesia. The merely technical and trifling procedure of doing a spinal tap and injecting a medicant in the subarachnoid space is the least important factor in spinal anesthesia. Your work, the really important work, begins the instant the needle is withdrawn.

No anesthetic should be routine for any service or for any operation. The word "routine" to me immediately connotes lack of experience and training in other methods, or failure to exercise care and judgment. The first step in any operation is the choosing of the anesthetic. We believe that choice should be made by the operating surgeon with due consideration to the patient's desire. I find, however, that even the most refractory patient will agree and cooperate nicely if the facts are carefully and truthfully presented. An exception to this rule is that we do not discuss this question with extremely ill patients or those suffering from toxic thyroids, in which case we practice anoci-association.

What are the factors that lead me so often to choose spinal anesthesia? It is not because I was raised on it from infancy. My early surgery was done almost exclusively with open drop ether, then later with nitrous oxide and ether vapor. Matas was perhaps the first to use spinal anesthesia in this country. At the Charity Hospital in New Orleans in 1899 he employed a solution of cocaine for spinal anesthesia. The late great John B. Murphy of Chicago must have used it similarly only a few days later. Because of the crudity of the drug and method it fell into disrepute. Babcock and a few other sporadic advocates used stovaine, but it was not until the renaissance of spinal anesthesia, due chiefly to the work of Pitkin in this country, that it reached its present popularity. It was at this time that I first employed spinal anesthesia and since then have been using it in an increasingly large percentage of cases.

In those early days we heard of broken needles and consequent laminectomy, of meningitis, of obstetric deaths, of paralysis of the lower extremities, of circulatory collapse and respiratory failure. Tragic and unfortunate as these catastrophes were, they and many others were the price exacted to map a safe course over an uncharted sea. I now believe that course of safety has been worked out and that spinal anesthesia, properly selected and given and then carefully watched, offers the safest form of anesthesia at our command. I have never had a spinal fatality in over one thousand cases and during that same span of years I can recall inhalation calamities that I would I could forget.

We choose spinal anesthesia then, not because we are used to it, not because of good reports we read, but because from actual experience in our hands it has delivered the best results. We believe the postoperative convalescence is happier and more comfortable following spinal than with any other anesthesia. Nausea and vomiting are reduced to a minimum, straining is avoided, cooperation is possible and the patient has a feeling of well-being and escapes the depression that follows a prolonged inhalation anesthesia. One

distressing symptom of spinal anesthesia is headache, which occurs in about 5 per cent of the cases on the third or fourth day, but this is usually easily controlled.

Spinal anesthesia places little or no strain on the kidneys; it is ideal in tubercular subjects; it allows of excellent relaxation and makes technically difficult procedures simple. The intestines drop away from the operative field, consequently packing off with its associated trauma is avoided. The mortality from peritonitis has been greatly lowered in such cases as ruptured appendicitis, intestinal obstruction, et cetera.

Spinal anesthesia has definite limitations if we are to use it with absolute confidence as to safety. It must not be used in the very young or very old. It should not be used for anesthesia above the diaphragm. It must not be used in cases of hemorrhage, such as ruptured ectopic pregnancy or other intraabdominal catastrophe. It should not be used during pregnancy, and should never be used in very large doses. Veal and VanWerden analyzed the cause of death in thirty fatalities occuring in 33,811 cases. It is astounding that practically all these fatalities could have been avoided by the few simple "don'ts" I have enumerated.

It seems to us that it is the duty of an anesthetist to form some contact with the patient prior to his arrival in the operating suite. It takes comparatively little time to make rounds of the cases scheduled for the following day, and the advantage is two-fold. It permits the anesthetist to size up her patient and gain much information and when they meet the next day it gives the patient a great sense of comfort to recognize a familiar face and voice amid the strange surroundings.

I am going to limit my description to one drug we have used with perfect safety. We employ neocaine, which is the trade name for procaine crystals, the dosage ranging from 80 milligrams to 150 milligrams. The patient is given a sedative, such as phenobarbital, the night before operation. Morphine and atropine are given one-half to three-quarters of an hour before operation. When taken to the anesthetizing room, the patient is permitted to sit up on the side of the table, resting his feet on a stool. The back is arched to increase the space between the vertebrae, and the site of puncture is determined according to the location of the pathology, varying from between first and second lumbar to third and fourth lumbar. In nervous or apprehensive patients it is always wise to raise a wheal and infiltrate with a few drops of novocaine, which makes the spinal tap entirely painless. In more stable individuals this is not necessary and may be dispensed with. In very sick patients the same procedure is used, merely turning the patient on his side, and it is almost as easily accomplished as in the sitting posture. In arching the back for puncture it should always be remembered that force should never be used but gentleness in all movements necessary to place the patient in the correct posture.

Spinal fluid is permitted to drop into the vial containing the procaine crystals, is mixed until dissolved and the solution is then slowly and without force injected into the the subarachnoid space. We feel that barbotage makes little or no difference in the height or duration of the anesthesia obtained. Immediately after the withdrawal of the needle the patient is placed in the Trendelenburg position to prevent cerebral anemia (not because of the gravitation of the anesthetic solution). The patient's eyes

should be covered so that when taken to the operating room he is spared the ordeal of unfamiliar and consequently, to him, gruesome sights. Some patients likewise prefer their ears plugged with cotton or lamb's wool, but I prefer my anesthetist to carry on a vocal anesthesia. It is surprising how a good line of chatter keeps the patient occupied and contented during even a long and tedious operation. At a baseball game when the catcher goes out to talk to the pitcher I am always inquisitive enough to wonder what they talk about, and at the operating table when my anesthetist keeps my patient so engrossed I am often more than a little curious to know what she is saying to him. However, most of you know far more about this phase than I do. I do know, however, that no mention should be made of his illness or the operation, or if he feels this or that, and above all else the word "pain" should never be used.

Patients with low blood pressure are given ephedrine by hypodermic injection before the spinal anesthesia is started. Patients who are bad risks have a slow intravenous drip of glucose and saline started immediately after spinalization and before the operation begins. The vitally important task from now on in spinal anesthesia is careful watching. We do not pay too much attention to the fall of blood pressure if the patient's condition remains good. Of course we have it taken continuously but do not get too perturbed by the figures as they are passed on to us. Adrenalin may be used as indicated. Of much more importance is the pulse, both as to rate, volume and character, and if the anesthetist reports untoward changes we immediately increase our slow intravenous drip, or if one has not been started, it is begun at once.

The respiration is of extreme importance and a change from thoracic to diaphragmatic breathing is not a good omen. Likewise the play of the alae of the nose or the dropping of the jaw is a threatening sign. The color of the patient is a good guide, and most important of all is that intangible something that we learn from experience and call the "patient's condition." The best remedy for embarrassed respiration is oxygen with increased pressure and perhaps a little carbon dioxide stimulation, but we rely chiefly on oxygen.

There are two groups of cases that are fortunately infrequent, but trying. In an extremely small percentage of cases, in spite of perfect technique there will be failure to anesthetize, or there will be a complete collapse of the anesthesia after a relatively short time. The second group includes the cases where a very long operation outlasts the spinal anesthesia. In either event it will be necessary to use reinforcement. If the hospital is equipped to give cyclopropane it is the ideal agent. If not, nitrous oxide and oxygen is next best, and in abdominal surgery we always combine it with an infiltration of the wound with ½ per cent novocaine. The addition of local infiltration takes but a few minutes and makes all the difference in the world from the standpoint of the anesthetist and the surgeon. We do not like ether anesthesia to reinforce spinal.

The anesthetist will know before the surgeon when the spinal is wearing off. She will detect the twinge of pain and the restlessness of her patient while the surgeon is otherwise occupied. By her early advice, which I always heed, she will save herself, the patient, and the surgeon considerable trouble. If one delays too long in reinforcing a spinal anesthetic the patient will be

straining, uncomfortable and uncooperative, and then inhalation reinforcement is very trying, but on the other hand if it is started early, before the spinal has completely worn off, little trouble will be experienced.

Much has been said and written concerning whether the anesthetist should or should not be a physician. To entice doctors into this phase of the work much bait has been offered. One large clinic in this country has given to the anesthesia department the decision as to the choice of the anesthetic, the fitness of the patient to withstand operation and the prerogative to tell the surgeon during the operation how much he may do. I can no more subscribe to such a method than I can have any patience or respect for the surgeon who ignores his anesthetist's advice and warnings. To me there is only one approach to the problem. It is like looking through a pair of binoculars focused on the patient's welfare. Through one glass the surgeon gazes, weighing the technical obstacles ahead, how long it will take him, how much relaxation he will need, and the condition of the patient's lungs and renal function. Through the other glass the anesthetist looks with a finger on the pulse, an eye on the respiratory rate and rhythm, watching the blood pressure and the patient's general condition.

If you and I can see eye to eye through those binoculars and focus without a blur, then and only then are we doing our best for the patient. The burden of responsibility for an individual's safety who comes to the operating room rests solely upon the surgeon. I feel that it is a mistake to relegate that burden to a department of anesthesia. Of course the surgeon needs help, plenty of it, furnished by the highest type of mind, training and experience. To me it is of little moment whether my helper signs her name M.D. or R.N.

THE FIRE AND EXPLOSIVE HAZARDS INVOLVED IN THE USE OF CYCLOPROPANE AS AN ANESTHETIC*

MRS. FRANCES HESS

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Cyclopropane (trimethylene) is now being used extensively as an anesthetic. It is supplied to the hospitals in small cylinders which contain the liquified gas under pressure of 75 pounds to the square inch at room temperature. Cyclopropane is one of the lower hydrocarbons and similar in its physical and chemical characteristics to its isomer, propylene, both having the formula C_3H_6. It is one and a half times as heavy as air and flashes below 0° Fahrenheit. When mixed with oxygen its explosive range is from 2.5 to 50 per cent.

Since the anesthetic mixtures of this gas fall directly into the explosive range, adequate precautions should be

* Read at the fourth annual meeting of the New York Association of Nurse Anesthetists, New York City, May 21, 1937.

taken to prevent explosions. Among the important things to be considered are:

1. Machine to be used
2. Humidity within the machine
3. Humidity within the operating room
4. Electrical equipment to be used
5. Ventilation and circulation within the operating room
6. Grounding

1. MACHINE TO BE USED. The machine through which the anesthetic is to be administered is the most important factor to be considered when using cyclopropane. The machine should be of the carbon dioxide absorption type, free from leaks, and extreme care should be taken to see that the mask fits closely to the patient's face. Also, cyclopropane should not be placed on a machine at the same connection at which other gases have been or will be used. Do not attempt to use cyclopropane on a machine that was not made for this purpose. The valve of the cyclopropane tank should be closed tightly as soon as the anesthetic is discontinued, and the machine not moved until this has been done. It is believed that the least probable source of ignition is from a metal spark, or ignition of metal particles by abrasive friction. This danger is particularly remote in an up-to-date anesthesia apparatus. A good way to secure a safe machine when buying a new one is to specify listings by Underwriters' Laboratories.

2. HUMIDITY WITHIN THE MACHINE. Cool water should be run through the rubber tubings and rebreathing bag before each anesthesia is started. If the mask is properly applied to the face, and there are no leaks in the connections of the machine, the humidity within the machine will increase as the anesthetic time increases because of the moisture-laden air expired by the patient. The chief danger is the generation of static caused by the friction of the rubber. The greater the humidity within the machine, the greater the safety.

3. HUMIDITY WITHIN THE OPERATING ROOM. This is the next and equally important consideration. The humidity can be ascertained easily by the use of a hygrometer. It has been found that at any given temperature with the relative humidity greater than 54 per cent, all static charges built up are immediately dissipated and harmlessly discharged by the slight film of water present on all objects within a room. (When the temperature of the admitted outside air is low, the relative humidity of the entering air, when heated to the temperature desired in the operating room, becomes less as the temperature is raised.)

Undoubtedly the best way to humidify the air in a room is by means of an air-conditioning unit, which will control the humidity and temperature at any desired level. This can be installed easily and to great advantage if done by a competent engineer. Next best are the portable humidifiers that evaporate and distribute sufficient water vapor. These are inexpensive, noiseless and effective. Some operating rooms are equipped with a steam pipe to which is attached a valve that can be opened to supply the water vapor necessary to maintain the relative humidity. Steam from sterilizers cannot be depended upon. Insulation of outside walls and storm sashes may be necessary to prevent collection of the moisture on the walls and windows.

4. ELECTRICAL EQUIPMENT TO BE USED. The second most prevalent cause of sparks is electrical equipment. The ideal condition would be to have all operating rooms furnished with electrical equipment in accordance with the National Electrical Code No. 32,

which calls for explosion-proof wiring in conduit, double globe explosion-proof lights, explosion-proof switches, motors and other equipment. However, the average hospital is not so equipped in all particulars. It is possible, however, to avoid certain electrical hazards by barring the use of sparking motors, live cautery, high frequency equipment, X-ray and fluoroscopic equipment from the operating room during the anesthesia. All electrical cords and wiring should be frequently and regularly examined to make sure that the insulation is sound. Electric lights that can be broken easily should be protected by vapor-proof globes to prevent breakage.

All electrical connections should be made before the cylinder of cyclopropane is turned on, and the connection not broken until ten minutes after the machine leaves the operating room, which will allow for the diffusion of the gases. If for any reason a connection must be made or broken, wet towels should be given to the anesthetist in ample time to cover the mask and any part of the machine that might not be tight and she should also be given plenty of time to turn off the cylinder of cyclopropane.

5. VENTILATION AND CIRCULATION WITHIN THE OPERATING ROOM. Although cyclopropane is one and a half times as heavy as air, when mixed with three to nine times its volume of oxygen it of course becomes lighter than air and hence more diffusible. Ventilation and circulation are important to insure an adequate supply of fresh air, to prevent the formation of pockets of anesthetic mixtures and to remove vitiated air. Although ventilating devices suitably located may no doubt help to reduce the danger of anesthetic explosions, they can hardly be regarded as other than palliative measures, because it will in practice be quite impossible to avoid the formation of explosive mixtures in the immediate vicinity of the patient. Cyclopropane is somewhat diffusible through rubber, consequently the smaller the amount of gases needed with a tight application of the face mask and tight machine connections, the less the spill and therefore the greater the safety.

6. GROUNDING. It is generally conceded that it is practically impossible to ground all apparatus properly and that the best means of avoiding static discharges is by humidification.

HAZARDS. Mixtures of *all* anesthetic agents are explosive except chloroform-air or oxygen, and nitrous oxide-air or oxygen. Nitrous oxide and oxygen, although not explosive, are both excellent supporters of combustion. Therefore, *never* use grease or oil on any part of the anesthetic apparatus.

Hazards include:

(a) Sparks
    1. Jump sparks
    2. Static sparks
(b) Live cautery
(c) Diathermy, coagulation, X-ray, high frequency machines
(d) Faulty electrical equipment
(e) Electrical storms
(f) Open flames

JUMP SPARKS. When an electrical contact is broken, the discharge of electricity takes the form of a more or less prolonged arc-like discharge which is usually preceded by the resistance heating of metal particles to a high temperature. Extinction occurs either when the supply of electrical energy is exhausted, or when the break has opened to such an extent that the resistance is too great to maintain a discharge. Care must therefore be taken with all electrical circuits, because

when any such circuits are open an arc will invariably be formed of sufficient intensity to ignite any explosive mixtures which may be present at the point where the circuit is broken.

STATIC SPARKS. The character of the electrostatic discharge is different. In this case, and particularly under conditions likely to pertain to accidental ignition, the rate of energy-dissipation is generally enormous, although the total amount of energy may be so small as to appear almost trivial. For example, a person wearing rubber soled shoes can well become charged to a potential of several thousand volts above earth. This voltage is sufficient to cause a spark to ground whenever the person touches a conductor of any sort. This may be of sufficient intensity to ignite any explosive mixture which may be present. Although maintained only for a fraction of a millionth of a second, it is to this exceedingly high rate of dissipation of energy that we can attribute the fact that even such feeble sparks as are sometimes produced by, for example, combing the hair, or discarding a wool or silk garment, can, and sometimes do, ignite gasoline-air mixtures, which may be regarded as relatively insensitive to ignition when compared with similar mixtures of ether.

Static spark charges are built up in various ways. Persons with dry skin are prone to the accumulation of static electricity because there is not a sufficient film of moisture on the skin to conduct the charge to the ground. It has been stated that such persons can actually light a gas fire from their finger tips. Woolen and silk materials are also sources of static sparks, therefore they should never be permitted in the operating room. Wooden or leather heels may produce a spark when striking the tile floor. A reported nitrous oxide-ether explosion was found to have been caused by the attendant pushing a rubber tired cart out of his way by means of the rubber mattress, while with the other hand he was pushing the gas machine.

2. LIVE CAUTERY is one wherein the degree of heat is regulated by the passing of the switch over the coils of wires, causing a spark. On the other hand, however, we do not look upon the low voltage actual cautery as being a source of danger if used at a considerable distance from the face of the patient, i. e., in cauterization of the cervix, hemorrhoids and in intestinal surgery, providing a vertical screen is placed between the mask and the field of operation, and the added precaution is taken of wet towels covering the patient's face and the gas machine where a leak is likely to occur, and the cylinder of cyclopropane is turned off before the cautery is connected.

3. DIATHERMY, COAGULATION, X-RAY, OR HIGH FREQUENCY MACHINES should not be used in an operating room in which an explosive anesthetic agent is being given. The danger in these cases is well recognized.

4. FAULTY ELECTRICAL EQUIPMENT. Low tension circuits (floor lights, et cetera) may be a source of considerable danger. It is essential that all electrical equipment be inspected *frequently* and *regularly* and more than the usual attention be given to the insulation of the leads and securing of the lamp-bulbs in the socket. Dead space in tubes carrying insulated wire might well be filled with a plastic insulator to prevent accumulation therein of explosive anesthetic agents. The misuse of a flexible cord is the violation most frequently found; this is usually in the form of an extension lamp. No hospi-

tal can afford to permit unsafe electrical conditions to exist.

5. ELECTRICAL STORMS. During the presence of an electrical storm the air is surcharged with electricity and a flame has been seen to enter the room. Therefore if one should be giving cyclopropane when an electrical storm occurs, it is advisable to turn off the cyclopropane at the cylinder and to give nitrous oxide. Also the entire face should be covered with a wet towel, but the breathing bag should not be emptied. When changing from cyclopropane to nitrous oxide, it is usually necessary to turn off the oxygen for a few minutes to prevent the lightening of the anesthesia which might occur because the patient is surcharged with oxygen.

6. OPEN FLAMES. Open flames which might be introduced by smoking, the use of gas-heated sterilizers, et cetera, are possible sources of ignition. In this day and age the average hospital is lighted by electricity, which also supplies the usual small power demands. Gas, however, is used to a considerable extent, and frequently when lighting is by electricity there is a gas connection for use in emergency and to supply the usual small laboratory burner requirements.

CONCLUSION. We have used cyclopropane in 2400 cases to date, and believe that the fire and explosive hazards involved in the use of cyclopropane are slight where proper care is exercised and that the degree of hazard is much less with cyclopropane-oxygen than with ether-oxygen or ethylene-oxygen. The possibility of fire or explosion is reduced to a minimum because of the high humidity within the machine and the extremely small amount of gas leakage. When cyclopropane is administered with oxygen in the proportion of 10 per cent of the anesthetic and 90 per cent of oxygen and the entire system is tight, it is not likely that any considerable concentration of the gases could escape under normal conditions. It would be practically impossible to have an explosion within the operating room that would cause any damage. I believe humidification within the machine and operating room is the most important factor in the prevention of explosion of anesthetic gases.

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RECTAL EVIPAL: A TECHNIQUE AND A DISCUSSION*

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The development of anesthesia during the post-war period has been marked by brilliant research, and in order that this development may continue it is necessary to investigate new fields and to ascertain their possibili-

* Read at the fourth annual meeting of the New York Association of Nurse Anesthetists, New York City, May 22, 1937.

ties. In the past, it has been comparatively easy to put the patient to sleep but it has occasionally been somewhat difficult to awaken the patient. More and more we are concerning ourselves with some means of elevation from the deep planes of anesthesia, thus controlling absolutely the ascent from, as well as the descent into, surgical anesthesia. We feel that we have made some progress in this direction and we are happy to be able to present, very briefly, some of the results of our work.

Evipal sodium was developed in Germany in 1932, and many reports of its successful use as a short, complete, intravenous anesthetic came from the Continent, as well as reports of 25,000 cases from Great Britain. Its use rectally was conceived by Gwathmey and a preliminary report by him was published in July, 1936. This report constitutes the entire literature in all languages, including the Scandinavian, on this subject.

The drug for use rectally is distributed in 3 gram bottles of a white crystalline powder. This is shaken into one ounce (30 cc.) of warm tap water, making a 10 per cent solution. All doses are calculated in cubic centimeters. This solution is non-irritating and causes no unpleasant sensation whatsoever when injected. Gwathmey recommended an index of 0.2 times the body weight (150 lb. man x 0.2 = 30 cc. of 10 per cent solution). This was slightly more than the calculated dose being given to old, debilitated, toxic or cachectic patients. He advocated its administration 10 to 15 minutes before operation and terminal supplementary anesthesia as required. With Gwathmey's work as a starting point we began this series. We made his index a straight multiple, using as a guide (1) the general condition of the patient; (2) the patient's reaction to the preanesthetic medication; and (3) the type of operation. If the patient were made drowsy by the opiate we reduced the amount of evipal we had intended using, and if the patient were seemingly unaffected, we increased the preconceived dose by a few cc.s.

We found that terminal supplementary anesthesia was not necessary but that we had to give additional inhalation anesthetic to allow for the incision. We felt that sufficient time had not been allowed for the descent of the patient along the planes of anesthesia and we now believe that administration one and one-quarter hours before operation is the optimum time for greatest effect. We divided the preanesthetic medication into two small doses, given one-half hour apart, rather than one large dose. Many more people are sensitive to the derivatives of opium than to those of barbituric acid, and we wished to guard against idiosyncrasy. Using small repeated doses we felt relatively safe since we should be able to detect sensitivity before any harm had been done, and greater effect was obtained in non-sensitive patients. We used $\frac{1}{48}$ grain of dilaudid hydrochloride and repeated this injection in one-half hour. We found that in using dilaudid hydrochloride in preference to morphine sulphate we were able to reduce postoperative vomiting from 16 per cent to 5 per cent, we obtained greater analgesia, less interference with peristalsis, and fewer catheterizations were necessary.

In this respect I should like to publicly acknowledge my gratitude to the Bilhuber-Knoll Corporation, the manufacturers of dilaudid hydrochloride, for their magnificent cooperation. They made a special tablet, $\frac{1}{48}$ of a grain, for hypodermic injection, so that no

possible error could occur in the reduction of a larger tablet.

Technique

For a patient going to operation at 10:00 A.M.: A soapsuds enema is given the night before and two allonal tablets are prescribed. The stronger barbituric acid derivatives are not advocated in conjunction with evipal, which is a cousin, so to speak, rather than a full member of this family.

A soda enema is given early on the morning of operation. At 8:00 A.M. dilaudid hydrochloride grain 1/48 is given hypodermically; at 8:30 A.M. dilaudid hydrochloride grain 1/48 hypodermically; and at 8:45 the patient is placed in Sims' position, made comfortable, a small catheter is introduced 4 inches into the rectum and the evipal solution is injected rapidly by means of a syringe. Ten cc. of warm tap water follows to clear the catheter of the anesthetic solution, and the patient is left in Sims' position. He is transferred to the stretcher in the same position, being placed on his back only when he is in the hands of the anesthetist in the operating room. This is done to avoid the danger of the patient's tongue falling back into the throat. The evipal is administered by nurses who are instructed as to color, pulse, respiration, and the maintenance of a clear airway.

Post-operative technique

One of the advantages of this type of anesthesia is its reversibility. We are able to return the patient to the first stage of anesthesia and allow him to sleep lightly through the pain zone. This is done by means of metrazol, which we give before the patient leaves the table—3 cc.s in the vein and 3 cc.s in the muscle. If the patient shows any sign of depression we give the entire 6 cc.s in the vein. When the patient is returned to bed, 2 cc.s of metrazol are given intramuscularly half hourly for two or three doses in order to maintain the analgesic stage achieved by the initial injections on the table. He is also turned from side to side every hour to promote bronchial drainage and general circulation.

The use of metrazol has been inaugurated routinely in this series to elevate the patient along the planes of anesthesia and not to overcome any apparent depression. Postoperative aeration of the bases of the lungs by means of stimulation with carbon dioxide (the so-called "washing out") is not advocated. We feel that metrazol is a milder, more uniform, more effective means of accomplishing complete aeration of the lung than the use of the carbon dioxide-oxygen mixture with its attendant danger of over-stimulation with laceration of the smaller alveoli. Metrazol, in addition to its action on the respiratory center, which increases the depth, but not the rate of the respiratory cycle, improves the volume of the pulse. The response is immediate—before the injection into the vein is completed the excursion of the thorax is increased. Patients occasionally awaken restlessly but a prompt injection of 1/24 grain of dilaudid controls them. The second awakening is calm and quiet.

Dosage

It cannot be too strongly emphasized that no set dose can be calculated, all of which must be given prior to operation, which will be correct in all cases without approaching extreme danger. Experience with patients under general surgical anesthesia is most necessary, since all anesthetics are dangerous in the hands of those not trained in their use.

We have found the following indices to be 90 per cent correct:

(1) 0.2 to 0.25 for orthopedic work

and for plastic operations on the vagina.

(2) 0.28 to 0.34 for extra-abdominal cases, which includes hernias.

(3) 0.35 to 0.4 for intraabdominal cases.

With these indices the necessity for supplementary inhalation anesthesia is rare and the amounts negligible. Should the occasion arise, we advocate the use of ether, or vinethene, with oxygen by means of the carbon dioxide absorption technique.

Patients are given fluids postoperatively as soon as desired. We find regurgitation without nausea in 5 per cent of patients. Patients who do regurgitate do so once or twice, usually twelve hours postoperatively, and resume the taking of fluids at once. Postoperative pulmonary complications have occurred in six patients, (3 per cent of the total number of cases). Three of these had preoperative bronchial pathology.

One of the most encouraging results from the use of this anesthetic agent is the pleasure of the patients in having escaped the horrors of the "mask," the "whirling of black pools," and the "roaring in the ears" which perhaps cannot be measured clinically but must be of enormous psychological and physiological import.

The ages in this series vary from a boy of three to a woman of 79; the weights from 40 pounds to 260 pounds; 80 per cent were private patients, one of whom was the wife of one of the operating surgeons using this anesthetic agent.

In this group there were three asthmatic patients; five diabetic patients, one patient with aortic regurgitation with sickle-celled anemia, one patient with acute appendicitis with influenza, one with acute mastoiditis with acute hemorrhagic nephritis, one with ruptured gangrenous gallbladder, one with ruptured ectopic who lost 1000 cc. of blood and was transfused on the table, two with perforated gastric ulcer and one with perforated duodenal ulcer; all of whom made uneventful recoveries. These cases were obviously from the "poor risk" group.

We must ask ourselves, "What is the value of this work?" Of course the ultimate answer will come from the great army of trained anesthetists after thousands of cases. But let us, who have developed this method of anesthesia, indulge in prophecy. Since a prophet has no honor in his own country, he may also have no honor in his own anesthesia, so we make the following predictions:

(1) Rectal evipal may not live as a complete anesthetic, since small added amounts of ether improve the relaxation and decrease the amount of restlessness on awakening. Work along these lines is proceeding.

(2) Rectal evipal will replace other basal anesthetics since it does not affect the pulse, blood pressure or blood chemistry. It is only a mild respiratory depressant.

(3) Metrazol as a means of elevating the patient to the first stage of anesthesia, as a means of complete aeration of the lungs without danger of over-stimulation, and as a factor in reducing postoperative pulmonary complications, with the hourly turning of the patient, has come to stay. This technique is applicable to any type of anesthesia.

(4) Dilaudid in small divided doses protects the patient, since sensitivity is recognized before danger is reached. Postoperatively it reduces nausea and vomiting, does not interfere with peristalsis and reduces nursing care.

ACTIVITIES OF STATE ORGANIZATIONS

MINNESOTA

The annual meeting of the Minnesota Association of Nurse Anesthetists was held in Rochester, Minn., May 13th and 14th, 1937, in conjunction with the Minnesota Hospital Association.

On May 13th the anesthetists met with the Mayo Clinic Journal Club. A number of abstracts pertaining to anesthesia were read by members of the anesthesia staff of the Mayo Clinic, with discussions following each paper. These abstracts are compiled and published annually in book form by the Journal Club. Slides on intratracheal anesthesia were shown also. In the evening all sections were guests of the City of Rochester at a dinner at the State Hospital.

On Friday morning a joint meeting with the Minnesota Hospital Association was held, at which time each affiliated group presented a paper. The Anesthesia Section was represented by Miss Anna Willenborg, St. Joseph's Hospital, Chicago, member of the Board of Trustees of the National Association of Nurse Anesthetists. Her paper outlined the objectives of the National organization and was very informative.

In the afternoon the anesthetists' meeting was held at St. Mary's Hospital. Dr. C. W. Mayo gave an address of welcome. Dr. Tuohy of the Mayo Clinic talked on "Aids to General Anesthesia," bringing out important points in the administration of different anesthetic agents and their combinations. Dr. Knight talked on "Obstetrical Analgesia." His remarks dealt with the cyclopropane analgesia machine designed for administration of cyclopropane by the patient during labor. Dr. Knight stressed the point that an anesthetist should be present at all times during the analgesia. Dr. John S. Lundy followed with a discussion of the papers and a talk on cyclopropane.

Miss Willenborg again read a paper entitled "The National Association of Nurse Anesthetists—Its Objectives, Purposes and Requirements for Membership." Miss Willenborg was asked many questions concerning membership and legislation, and the members of the Minnesota organization felt that great help had been given them by Miss Willenborg's gracious and intelligent explanation.

The anesthetists attended the banquet of the Minnesota Hospital Association held at the Kahler Hotel.

MISSISSIPPI

The first annual meeting of the Mississippi Association of Nurse Anesthetists was held in Meridian, Miss., on May 11th, 1937.

Papers were read by Mrs. Sam Owens, Electric Mills, Miss., and Mrs. Irene Mason, Greenville, Miss.

The following officers were elected:

President	Emma Easterling Vicksburg Clinic, Vicksburg, Miss.
First Vice-President	Irene Mason, Greenville, Miss.
Second Vice-President	Maud E. Varnado Laurel General Hospital, Laurel, Miss.
Secretary-Treasurer	Mrs. Sam Owen Electric Mills, Miss.

MISSOURI

SYLVIA COLE, PRESIDENT

The third annual meeting of the Missouri Association of Nurse Anesthetists was held at the Missouri Athletic Association Club, St. Louis, on April 28th, 1937.

A round table discussion was conducted on anesthesia, and this was followed by a business meeting and the election of the following officers:

President	Sylvia Cole Jewish Hospital, St. Louis, Mo.
Vice-President	Cecelia Frein St. John's Hospital, St. Louis, Mo.
Second Vice-President	Beatrice Newman St. Luke's Hospital, St. Louis, Mo.
Treasurer	Frieda Spleth Missouri Baptist Hospital, St. Louis, Mo.
Trustee	Doris Grupp Beaumont Medical Bldg., St. Louis, Mo.

Edith Marcum, Jewish Hospital, St. Louis, Mo., was appointed Secretary of the Association.

NEW YORK

IDA MAUDE EDWARDS, PRESIDENT

The fourth annual meeting of the New York Association of Nurse Anesthetists was held in New York City, May 20th, 21st and 22nd, 1937, in conjunction with the New York Hospital Association. The attendance was excellent and the papers interesting and helpful. The program was published in detail in the May issue of the Bulletin.

The following officers were elected:

President	Ida M. Edwards Strong Memorial Hospital, Rochester, N. Y.
Vice-President	Evelyn Roach 1320 York Avenue, New York, N. Y.
Secretary-Treasurer	Hazel Blanchard 1910 Seventh Avenue, Troy, N. Y.
Historian	Anne Savage Brooklyn Hospital, Brooklyn, N. Y.
Trustees	Verna Bean (two years) 480 Herkimer Street, Brooklyn, N. Y. Martha Henneberger (two years) 141 West 109th Street, New York, N. Y. Sister Mary Inez Omalia (one year) 1365 Abbott Road, Buffalo, N. Y.

OKLAHOMA

Mrs. Pierina Egan called a meeting of the Oklahoma Anesthetists which was held in Oklahoma City for the purpose of organizing the Oklahoma anesthetists. Seven anesthetists were present and the following officers were elected:

President	Mrs. Pierina Egan Wewoka Hospital, Wewoka, Okla.
Vice-President	Alma Webb Morningside Hospital, Tulsa, Okla.
Secretary	Julia Loftus Community Hospital, Elk City, Okla.
Treasurer	Mrs. Eula McNeil Parks 6th Street, McAlester City, Okla.

The Oklahoma Association voted to make application for affiliation with the National Association of Nurse Anesthetists. The date of the first annual meeting will be announced later.

OREGON

Miss Aimee Doerr, Multnomah Hospital, Portland, Ore., President of the Oregon Association of Nurse Anesthetists, has been elected a delegate to the National convention in Atlantic City.

PENNSYLVANIA

The sixth annual meeting of the Pennsylvania Association of Nurse Anesthetists, and third in conjunction with the Pennsylvania Hospital Association, was held June 2nd, 3rd and 4th, 1937, at Buck Hill Falls, Pa. The program was published in full in the May issue of the Bulletin.

The report of Miss Rose G. Donovan, Secretary-Treasurer, showed:

Membership in good standing April 22, 1936	160
Membership in good standing June 1, 1937	195
Correspondence received—number of pieces	784
Correspondence mailed—number of pieces	1465

TREASURER'S REPORT

Statement of Receipts and Disbursements

April 16, 1936, to March 31, 1937

RECEIPTS

Balance April 16, 1936	488.14	
Dues	972.25	
Initiation Fees	36.00	
Refund of Expenses	34.00	
Sale of Pins	5.75	
Unallocated Receipts	2.00	
Total Receipts		1,538.14

DISBURSEMENTS

Transferred to National Association		
Initiation Fees	33.00	
Dues	521.75	
		554.75

Dues Refunded	12.00	
Office Expenses	96.29	
Convention Expenses	302.99	
Pins	4.75	
Total Disbursements		970.78
Balance—March 31, 1937		$ 567.36
Represented by—		
Cash on Deposit in Bank		$ 567.36

Report of Membership Committee, Miss R. Margaret Kramlich, Chairman:

Applications approved from April 18, 1936 to June 2, 1937:

Active	45
Associate	2

Report of Public Relations Committee, Mrs. Sarah S. Ponesmith, Chairman:

There are no legislative bills pending at the present time that in any way concern nurse anesthetists.

A motion was made and carried to proceed with plans for the incorporation of the Pennsylvania Association of Nurse Anesthetists.

The following officers were elected:

President	Rose G. Donovan Mt. Sinai Hospital, Philadelphia, Pa.
Second Vice-President	Edith Abary Harrisburg Hospital, Harrisburg, Pa.
Secretary-Treasurer	Mrs. Helen Young Walker, 1824 Wallace Street, Philadelphia, Pa.
Trustees for two years	Marian L. Robinson Pennsylvania Hospital, Philadelphia, Pa.
	Daisy Sisson, St. Luke's Hospital, Bethlehem, Pa.
	Mrs. Helen Perry, Allegheny General Hospital, Pittsburgh, Pa.

MISS HILDA SALOMON PRESENTED WITH LIFE MEMBERSHIP

At the annual meeting of the Pennsylvania Association of Nurse Anesthetists held in Buck Hill Falls, Penna., June 2nd, 3rd and 4th, 1937, a motion was made and carried unanimously that Miss Hilda R. Salomon, President of the National Association of Nurse Anesthetists, be presented with a life membership in the State and National Associations in appreciation of the honor she has brought to the Pennsylvania Association and for her unfailing loyalty and untiring efforts in behalf of both the State and National Associations.

TEXAS

DOROTHY HOADLEY, PRESIDENT

The second annual meeting of the Texas Association of Nurse Anesthetists was held in Lubbock, Texas, April 23rd and 24th, 1937, in conjunction with the Texas Hospital Association. The program was published in full in the May, 1937, issue of the Bulletin.

The third annual meeting of the Texas Association will be held in Houston, Texas, in 1938. The date will be announced later.

The following officers were elected:

President	Dorothy Hoadley, Methodist Hospital, Fort Worth, Texas
Vice-President	Elizabeth Harrist Lubbock Sanitarium, Lubbock, Texas
Secretary-Treasurer	Ora Lee Mercer 207 Medical Arts Bldg., Fort Worth, Texas

Miss Florence Thompson of Dallas was appointed a member of the Membership Committee. Mrs. Velma Thompson, Baylor University Hospital, Dallas, was appointed Chairman of the Program Committee.

MEETING OF ALUMNAE ASSOCIATION

Miss Ann Nightengale, Lutheran Hospital, Cleveland, Ohio, President of the Alumnae Association University Hospitals (Lakeside) School of Anesthesia, wishes to remind the members of the Alumnae Association of the annual meeting, which will be held in Atlantic City during the convention of the National Association of Nurse Anesthetists. Time and place will be announced later.

NOTICE

The Association headquarters' office desires to call attention to some complaints which have in the past been received from members concerning the sending of money to the headquarters' office by mail without its ever having been received at the Treasurer's office. These losses are very probably explained by the recent arrest and conviction of an employee at Lakeside Hospital, where the Treasurer's office is located. This employee was arrested for intercepting mail and removing cash therefrom, and there was found upon his person a letter from an Association member which had contained a remittance. It is suggested that remittances in the future be made either by postal money order, registered mail, or personal check.

MARY LUCILE GOODMAN.
Executive Secretary

It is urged that each subscriber to the Bulletin notify National headquarters promptly of any change of address, in order that all issues of the Bulletin may be received. The Bulletin is mailed out as second class matter and is not forwarded, but returned to this office.

Members National Association of Nurse Anesthetists

JULY 1st, 1937

ALABAMA		
Beddow, Annie M.	Norwood Hospital	Birmingham, Ala.
Bell, Fannie R.**	St. Vincent's Hospital	Birmingham, Ala.
Bradford, Elizabeth	South Highlands Infirmary	Birmingham, Ala.
Burnes, Sarah Ola	Forrest General Hospital	Gadsden, Ala.
Foust, Alma C.*	Colbert County Hospital	Sheffield, Ala.
Hibbetts, Mary J.	St. Vincent's Hospital	Birmingham, Ala.
Hill, Emily McClinton	Bellamy Hospital	York, Ala.
Holmquist, Edith	South Highland Infirmary	Birmingham, Ala.
Long, Elsie Owens**	306 Medical Art Building	Birmingham, Ala.
Maenner, Rose E.	59 Le Moyne Place	Mobile, Ala.
Michaelis, Clara	310 First National Bank Bldg.	Birmingham, Ala.
Norred, Annice E.	932 Sixth Avenue	Birmingham, Ala.
Parks, Mary B.	Druid City Hospital	Tuscaloosa, Ala.
Rice, Verna M.	R. F. D. No. 1, Box 116	Mobile, Ala.
Stone, Clara	429 N. Walnut St.	Florence, Ala.
Traber, Anna	2121 Highland Ave.	Birmingham, Ala.
Warlick, Hattie	South Highlands Infirmary	Birmingham, Ala.
Wilkes, Ruth G.	Frasier-Ellis Hospital	Dothan, Ala.
ARIZONA		
Dearing, Lennie B.***	Box 88	Flagstaff, Ariz.
Shockites, Helen A.	Cochise County Hospital	Douglas, Ariz.
ARKANSAS		
Petty, Blanche G.	726 Donaghey Bldg.	Little Rock, Ark.
Pollard, Katie	St. Vincent's Infirmary	Little Rock, Ark.
Raper, Edith W.	Trinity Hospital	Little Rock, Ark.
Summers, Mary Duncan	Julia Chester Hospital	Hope, Ark.
Tate, Thelma R.	St. Louis So'west'n R'y Hosp.	Texarkana, Ark.
CALIFORNIA		
Anderson, Anna G.	Letterman Gen'l Hospital	Presidio of San Francisco, Cal.
Andersen, Emmeline	Mercy Hospital	Sacramento, Cal.
Anderson, Vera M.	390 Central Ave.	Oakland, Cal.
Barbee, Genevieve	1318 Pine St.	Martinez, Cal.
Barker, Betty	St. Francis Hospital	San Francisco, Cal.
Bartron, Kathryn	2625 Parker Ave.	Oakland, Cal.
Bates, Alta	Alta Bates Hospital	Berkley, Cal.
Berry, Comfort A.	Peralta Hospital	Oakland, Cal.
Bickel, Martha	Franklin Hospital	San Francisco, Cal.
Bishop, Anna K.	St. Mary's Hospital	San Francisco, Cal.
Bolton, Gladys M.	1511 Jackson St.	Oakland, Cal.
Bulin, Emma J.	Jackson Lake Hospital	Oakland, Cal.
Casey, Veronica	San Francisco Hospital	San Francisco, Cal.
Clutton, Evangeline M.	Peralta Hospital	Oakland, Cal.
Deering, Bessie G.	Sutter Hospital	Sacramento, Cal.
de Garcia, Levina B.	1010 Fell St.	San Francisco, Cal.
de Shazo, Laura E.	Public Surgery Corporation	San Francisco, Cal.
Duffey-Fox, L. de Ette	Sanitarium	Napa County, Cal.
Duncan, Cleo	El Cortez Apartments	Sacramento, Cal.
Ellis, Vyevene	402 Hudson St.	Oakland, Cal.
Gillen, Julia***	574 Walnut St.	Palo Alto, Cal.

*President State Association
**Secretary State Association
***Associate Member

Graham Katherine H.	San Francisco Hospital	San Francisco, Cal.
Grimes, Flora A.	Sutter Hospital	Sacramento, Cal.
Grunewald, Louise I.	East Oakland Hospital	Oakland, Cal.
Guptill, Martha M.**	Samuel Merritt Hospital	Oakland, Cal.
Hall, Priscilla	St. Frances Hospital	San Francisco, Cal.
Hebert, Maria Lya		
Holmes, Amelia L.	San Joaquin Gen'l Hospital	French Camp, Cal.
Hoover, Zola P.	Rt. 7, Box 4119	Sacramento, Cal.
Huntimer, W. Serena	St. Mary's Hospital	San Francisco, Cal.
Jevne, Sophie	6331 Hollywood Blvd.	Hollywood, Cal.
Johnson, Mary	1904 Franklin St.	Oakland, Cal.
Jones, Edith H.	St. Francis' Hospital	San Francisco, Cal.
Keegan, Helen	Mary's Help Hospital	San Francisco, Cal.
Keenan, Katherine	4100 Fulton St.	San Francisco, Cal.
Kemp, Ada Irene	Franklin Hospital	San Francisco, Cal.
Kittleson, Beatrice M.	Peninsula Com. Hospital	Carmel-by-the- Sea,
Krekeler, Irene F.***	523 B. 42nd St.	Oakland, Cal.
Kulchar, Helen E.	East Oakland Hospital	Oakland, Cal.
Lewis, Myrna	Cottage Hospital	Santa Barbara, Cal.
McCoppin, Margaret	Sutter Hospital	Sacramento, Cal.
McKinstry, D. C. B.	450 Sutter	San Francisco, Cal.
Malamphy, May	Southern Pacific Hospital	San Francisco, Cal.
Morgan, Gay**	Southern Pacific Hospital	San Francisco, Cal.
Ogelsby, Fannie M.	Peralta Hospital	Oakland, Cal.
Peck, Virginia	1051 Flood Bldg.	San Francisco, Cal.
Pence, Mada	Enloe Hospital	Chico, Cal.
Peters, Lillian L.	San Francisco Hospital	San Francisco, Cal.
Piercy, F. Margaretta	San Francisco City & County Hospital	San Francisco, Cal.
Pray, Jean H.	431 — 30th St.	Oakland, Cal.
Pringle, Gertrude Noble	65 Buena Vista Ave.	San Francisco, Cal.
Quarles, Myra B.*	Children's Hospital of the East Bay	Oakland, Cal.
Rausch, Sarah	Mary's Help Hospital	San Francisco, Cal.
Sister M. R. Wiederkehr	St. Joseph's Hospital	San Francisco, Cal.
Schreiber, Olga E.	St. Francis Hospital	San Francisco, Cal.
Schultz, Adella I.	Providence Hospital	Oakland, Cal.
Searcy, Geraldine L.	San Francisco Hospital	San Francisco, Cal.
Snail, Alice Edith***	Tuolumne County Hospital	Sonora, Cal.
Sponheim, Mina G.	Mary's Help Hospital	San Francisco, Cal.
Stevenson, Mary J. R.*	Franklin Hospital	San Francisco, Cal.
Suggett, Nan	St. Francis Hospital	San Francisco, Cal.
Tynan, Gertrude L.	Providence Hospital	Oakland, Cal.
Vortman, Helen A.	Sutter Hospital	Sacramento, Cal.
Waggoner, Mildred C.	610 Geary St.	San Francisco, Cal.
Walsh, Blanche L.	1904 Franklin St.	Oakland, Cal.
Watkins, Kathryn	Samuel Merritt Hospital	Oakland, Cal.
Wilkinson, Irma	1001 Pine St.	San Francisco, Cal.
Wilson, Eva M.	Highland Hospital	Oakland, Cal.
Winter, Cecelia M.	Cottage Hospital	Santa Barbara, Cal.
Witt, Clara M.	Alameda Sanatorium	Alameda, Cal.
Yost, Marian L.	St. Francis Hospital	San Francisco, Cal.

COLORADO

Adair, Helen M.	Children's Hospital	Denver, Colo.
Bowden, Louise E.	756 Colorado Blvd.	Denver, Colo.
Carpenter, May M.*	2370 Ash St.	Denver, Colo.
Currie, Ethel F.	Presbyterian Hospital	Denver, Colo.
Ferguson, Geraldine V.	Fitzsimon's Gen'l Hospital	Denver, Colo.
Heckert, Sadie L.**	3326 West 29th Ave.	Denver, Colo.

Hogan, Helen E.	Box 644	Colo. Springs, Colo.
Kramer, Margaret L.	Corwin Hospital	Pueblo, Colo.
Macfarlane, Louise E.	Parkview Hospital	Pueblo, Colo.
Moon, Henrietta M.	Presbyterian Hospital	Denver, Colo.
Sister Rose Bernadette Van Zele	St. Joseph Hospital	Denver, Colo.
Sister Mary S. Duffy	Mt. San Rafael Hospital	Trinidad, Colo.
Schnepper, Louise H.	Boulder Sanitarium	Boulder, Colo.
Stevens, Ann McDonald	1619 Milwaukee St.	Denver, Colo.

CONNECTICUT

Allcock, Alice	Charlotte Hungerford Hospital	Torrington, Conn.
Blaney, May V.	St. Francis Hospital	Hartford, Conn.
Clarke, Lula Agnes		
Dougan, Janet Beck	Danbury Hospital	Danbury, Conn.
Fanning, Julia Frances	New Britain Gen'l Hospital	New Britain, Conn.
Gardner, Martha E.	Bridgeport Hospital	Bridgeport, Conn.
Golding, Mildred I.	Lawrence & Mem'l Associated Hospitals	New London, Conn.
Gordon, Mary K.	Mt. Sinai Hospital	Hartford, Conn.
Hunt, Alice M.	New Haven Hospital	New Haven, Conn.
Hutchinson, Doris I.	Manchester Mem'l Hospital	Manchester, Conn.
Kunselman, Sarah J.	Litchfield County Hospital	Winsted, Conn.
MacPherson, Margaret	St. Vincent's Hospital	Bridgeport, Conn.
Myers, Margaret	Bristol Hospital	Bristol, Conn.
Norwood, Alice L.	Charlotte Hungerford Hospital	Torrington, Conn.
O'Donnell, Ann Rita	St. Francis Hospital	Hartford, Conn.
Powers, Annie E.	370 Collins St.	Hartford, Conn.
Reed, Marion A.	Lawrence &Mem'l Ass'd Hosp.	New London, Conn.
Ryan, Ellen	883 Quinnipiac St.	New Haven, Conn.
Stover, Ethel	Bridgeport Hospital	Bridgeport, Conn.
Sullivan, Laura R.	St. Mary's Hospital	Waterbury, Conn.
Vezina, Clara A.	Bridgeport Hospital	Bridgeport, Conn.

DELAWARE

Coane, Marcelen P.	St. Francis Hospital	Wilmington, Del.
Gentle, Marjorie M.	Wilmington General Hospital	Wilmington, Del.
Powell, Jessie E.	Delaware Hospital	Wilmington, Del.

DISTRICT OF COLUMBIA

Fox, Carrie Belle C.	1345—19th St., Apt. 1132	Washington, D. C.
Flewwelling, Isabelle M.	Army Medical Center	Washington, D. C.
Lomax, Mary E.	Walter Reed Hospital	Washington, D. C.
Sheppard, Dorothea	4916 Van Ness St., N.W.	Washington, D. C.
Short, Augusta Lee	Walter Reed Gen'l Hospital	Washington, D. C.

FLORIDA

Brown, Mary C.	New York Hospital	New York, N. Y. (temporary)
Card, Jennie A.	1215 French Ave.	Sanford, Fla.
Compton, Evon E.	Orange Clinic	Orlando, Fla.
Creelman, Margaret E.	Tampa Mun. Hospital	Tampa, Fla.
Davis, Nellie G.	1426 Ninth St., N.	St. Petersburg, Fla.
Edwards, Mrs. J. S.***		Zellwood, Fla.
Ellis, Ida Tedford*	1210 Kuhl Ave.	Orlando, Fla.
Kenney, Florence	St. Francis Hospital	Miami, Fla.
Kossack, Michalina A.	Dade County Hospital	Miami, Fla.

GEORGIA

Bresnahan, Mary	Central of Ga. Railway Hosp.	Savannah, Ga.
Carnes, Rhea	Archbold Memorial Hospital	Thomasville, Ga.
Dasher, Annie L.	202 E. Liberty St.	Savannah, Ga.
Ely, Pearle	Box 404	Valdosta, Ga.
Grubb, Mary Ann	Strickland Mem'l Hospital	Griffin, Ga.
Hume, Margaret E.	Archbold Mem'l Hospital	Thomasville, Ga.
Litzen, Catherine	Emory University Hospital	Emory Univ'sity, Ga.
McDonald, Rosalie C.	Emory University Hospital	Emory Univ'sity, Ga.
Paris, Margaret J.	Emory University Hospital	Emory Univers'y, Ga.
Rowzee, Theo Lanier	1120 Doctors Bldg.	Atlanta, Ga.

IDAHO

Egan, Pierina Ghidoni	L. D. S. Hospital	Idaho Falls, Idaho
Henggeler, Martha M.	917½ Fort St.	Boise, Idaho
Mathews, Newty	Box 23	Murtaugh, Idaho
Sister F. Thibodeau	Providence Hospital	Wallace, Idaho
Sister Joseph Arthur	Providence Hospital	Wallace, Idaho

ILLINOIS

Abell, Ora E.	Schmitt Mem'l Hospital	Beardstown, Ill.
Baines, Julia T.	1368 Sedgwick St.	Chicago, Ill.
Berg, Anna B.	Community Hospital	Geneva, Ill.
Blau, Pauline A.	2321 Chicago Ave.	Chicago, Ill.
Blickendorfer, Anna	536 Webster Ave.	Chicago, Ill.
Botsford, Daisy G.	1324 No. Sheridan Rd.	Waukegan, Ill.
Braun, Margie V.	430 S. Harlem Ave.	Freeport, Ill.
Brooks, Mary	Berwyn Hospital	Berwyn, Ill.
Brown, Avis M.	Sherman Hospital	Elgin, Ill.
Burke, Ursula M.	Evanston Hospital	Evanston, Ill.
Burnett, Anna P.	Victory Memorial Hospital	Waukegan, Ill.
Cameron, Mrs. Mae B.	Ravenswood Hospital	Chicago, Ill.
Carico, Pauline R.	Champaign County Hospital	Urbana, Ill.
Clardy, Grace I.	Garfield Park Hospital	Chicago, Ill.
Colvin, Thelma V.	Hinsdale Sani. & Hospital	Hinsdale, Ill.
Cornwell, Verna E. ***	Norwegian-American Hosp.	Chicago, Ill.
Coupland, Margaret	Methodist Hospital	Peoria, Ill.
Crane, Mrs. Katherine	Springfield Hospital	Springfield, Ill.
Daniels, Clorecia	653 Belmont Ave.	Chicago, Ill.
Davis, Clara Fern***	Springfield Hospital	Springfield, Ill.
Egleston, Ada M.	American Hospital	Chicago, Ill.
Estry, Mable M.	Michael Reese Hospital	Chicago, Ill.
Falconer, Geneva B.	St. John's Hospital	Springfield, Ill.
Fossum, Alma	1649 W. Jackson Blvd.	Chicago, Ill.
Girkin, Nettie R.	Michael Reese Hospital	Chicago, Ill.
Gruska, Hermina Emily	Jackson Park Hospital	Chicago, Ill.
Guibor, Mrs. G. P.	536 Christie St.	Ottawa, Il.
Hallowell, Esther	Silver Cross Hospital	Joliet, Ill.
Halm, Vincentia G.	2449 So. Dearborn	Chicago, Ill.
Hanner, Bonnie Bell	Augustana Hospital	Chicago, Ill.
Hansen, Elizabeth T.	Henrotin Hospital	Chicago, Ill.
Hard, Mabel D.	Jackson Park Hospital	Chicago, Ill.
Hartley, Ora M.	Grant Hospital	Chicago, Ill.
Hellickson, Helga C.	Ravenswood Hospital	Chicago, Ill.
Hickey, Mary C.	952 Alton Road	Miami Beach, Fla. (temporary)
Hoagland, Jennie	Cook County Hospital	Chicago, Ill.
Hoffman, Gladys Mary	Englewood Hospital	Chicago, Ill.
Holmes, Edith Helen	St. Francis Hospital	Evanston, Ill.
Hemmig, Emilie	Oak Park Hospital	Oak Park, Ill.

Hunt, Valeda V.	Dixon Public Hospital	Dixon, Ill.
Kasten, Mary C.	St. Anne's Hospital	Chicago, Ill.
Kedas, Anne E.	Michael Reese Hospital	Chicago, Ill.
Kraus, Paula	740 Hayes Ave.	Oak Park, Ill.
Krawczyk, Anna A.	Woodlawn Hospital	Chicago, Ill.
Lane, Maud	Englewood Hospital	Chicago, Ill.
Lebkuecher, Ethel M.	Decatur & Macon Co. Hospital	Decatur, Ill.
Leidel, Leeta	Wabash Hospital	Decatur, Ill.
Leitner, Lillian L.	St. Joseph's Hospital	Alton, Ill.
Lemmons, Geneva	Franklin Blvd. Hospital	Chicago, Ill.
Lenihan, Julia	Frances Willard Hospital	Chicago, Ill.
Loehrke, Amelia J.	427 Dickens Ave.	Chicago, Ill.
McCall, Catherine	Frances E. Willard Hospital	Chicago, Ill.
McGinley, Edith	St. Luke's Hospital	Chicago, Ill.
McGraw, Mary R.	Little Company of Mary Hosp.	Evergreen Park, Ill.
Mahoney, Alice I.	5735 S. Wood St.	Chicago, Ill.
Maire, Frances H.	Elmhurst Hospital	Elmhurst, Ill.
Marsh, Margaret	Woodlawn Hospital	Chicago, Ill.
Massey, Beatrice E.***		
Mausz, Angelene	Garfield Park Com'y Hospital	Chicago, Ill.
Morgan, Velma Mae	Decatur & Macon Co. Hosp.	Decatur, Ill.
Myers, Hilda	Edgewater Hospital	Chicago, Ill.
Myres, Wanda M.		
Myrseth, Gudrun	Ingalls Memorial Hospital	Harvey, Ill.
Murray, Edna M.	J. C. Hammond City Hosp.	Geneseo, Ill.
Nelson, Anna N.	Grant Hospital	Chicago, Ill.
New, Margaret O.	W. Frankford Union Hospital	West Frankford, Ill.
Newton, Mary M.	Graham Hospital	Canton, Ill.
Nichol, Mabel A.	Silver Cross Hospital	Joliet, Ill.
Nugent, Agnes L.	St. Joseph Hospital	Chicago, Ill.
O'Day, Exire	Ravenswood Hospital	Chicago, Ill.
O'Leary, Helen E.	Passavant Hospital	Chicago, Ill.
Olson, Anna M.	Grant Hospital	Chicago, Ill.
Pettigrew, Sara N.	105 West 3rd St.	Sterling, Ill.
Pippereit, Martha A.	Chicago Memorial Hospital	Chicago, Ill.
Priester, Ann	West Suburban Hospital	Oak Park, Ill.
Ptaszek, Agnes	St. Anne's Hospital	Chicago, Ill.
Riley, Alice Madge	Augustana Hospital	Chicago, Ill.
Rinella, Edris P.	Illinois Central Hospital	Chicago, Ill.
Roth, Jean	Mercy Hospital	Chicago, Ill.
Roun, Anna M.	Passavant Hospital	Chicago, Ill.
Sister Adolpha Ray	St. John's Hospital	Springfield, Ill.
Sister M. A. Tamosaitis	2700 W. 69th St.	Chicago, Ill.
Sist. Andrea Weisgerber	St. John's Hospital	Springfield, Ill.
Sister M. A. Rauch	St. Joseph's Hospital	Joliet, Ill.
Sist. Bernadine Shaudis	St. John's Hospital	Springfield, Ill.
Sister M. Borgia Gabrys	St. Anthony Hospital	Chicago, Ill.
Sister M. B. Suplicka	St. Francis Hospital	Peoria, Ill.
Sister Capistrana Hylla	St. John's Hospital	Springfield, Ill.
Sister M. C. Ziskel	St. Charles Hospital	Aurora, Ill.
Sister M. Cleta Mehn	St. Elizabeth's Hospital	Granite City, Ill.
Sister M. C. Berwarth	St. Anthony's Hospital	Chicago, Ill.
Sister M. G. Schiffer	St. Joseph's Hospital	Elgin, Ill.
Sister M. H. Nowak	St. Francis Hospital	Freeport, Ill.
Sister M. H. Makstutis	St. Joseph's Hospital	Joliet, Ill.
Sister M. I. Cassellius	St. Joseph's Hospital	Joliet, Ill.
Sister Jovita Schumann	St. Joseph's Hospital	Joliet, Ill.
Sister M. K. Flentz	St. Mary's Hospital	LaSalle, Ill.
Mother Magdalene Wiedlocher***	St. Francis Convent	Riverton, Ill.

Sister M. L. Odenthal	St. Joseph's Hospital	Joliet, Ill.
Sister M. L. Panter	St. Francis Hospital	Freeport, Ill.
Sister M. Cassellius	St. Charles Hospital	Aurora, Ill.
Sister M. M. Sauer	St. Joseph's Hospital	Elgin, Ill.
Sister St. Marg. Mary	St. Bernard's Hospital	Chicago, Ill.
Sister M. O. Wiederkehr	St. Joseph's Hospital	Elgin, Ill.
Sister Regula	St. John's Hospital	Springfield, Ill.
Sister Rudolpha	St. John's Hospital	Springfield, Ill.
Sister Sophie Gebhard	St. John's Hospital	Springfield, Ill.
Sister M. S. Balciunas	2700 W. 69th St.	Chicago, Ill.
Sister M. T. Ettelbrick	St. Anthony de Padua Hospital	Chicago, Ill.
Sister M. A. Walloch	St. Joseph's Hospital	Joliet, Ill.
Sister Florine Nitzpan	St. Mary's Hospital	Decatur, Ill.
Pearl Scherer	Route 6	Olney, Ill.
Seater, Mary Dunn	St. John's Hospital	Springfield, Ill.
Shaw, Jean	Oak Park Hospital	Oak Park, Ill.
Stenstrom, Naomi S.	South Shore Hospital	Chicago, Ill.
Stoltz, Frieda L.	St. Luke's Hospital	Chicago, Ill.
Stuart, Linda M.	St. James Hospital	Chicago Heights, Ill.
Suttle, Ethel M.	St. Francis Hospital	Macomb, Ill.
Talcott, Mrs. Marie	Lincoln Hospital	Rochelle, Ill.
Teubel, Pauline E.***	P. O. Box 265	Evergreen Park, Ill.
Tyler, Dorothy	St. Luke's Hospital	Chicago, Ill.
Vincent, Nelle G.	Evanston Hospital	Evanston, Ill.
Walcher, Dorothy E.		Sparta, Ill.
Welinske, Matilda A.	St. Francis Hospital	Evanston, Ill.
Whitford, Mae L.	Collins Clinic	Peoria, Ill.
Whitney, Madge***	Wilder Clinic	Chicago, Ill.
Willenborg, Anna	St. Joseph Hospital	Chicago, Ill.

INDIANA

Baker, Alma G.	Jasper County Hospital	Rensellaer, Ind.
Church, Margaret P.*	1016 Garden St.	Fort Wayne, Ind.
Deane, Thelma A.***	130 W. Miami Ave.	Logansport, Ind.
Efinger, Irene H.	St. Mary's Hospital	Evansville, Ind.
Glueck, Martha Jacob	715 Perry St.	Vincennes, Ind.
Gray, June***	429 E. Wayne St.	Ft. Wayne, Ind.
Kirschner, Regina R.	Marion General Hospital	Marion, Ind.
Kitchen, Mildred	2610 Fairfield View Place	Ft. Wayne, Ind.
Lange, Agnes M.**	336½ Killea Ave.	Fort Wayne, Ind.
Reitz, Helen M.	St. Mary's Hospital	Evansville, Ind.
Von der Au, Anna	2902 Fairfield Ave.	Fort Wayne, Ind.
Warnock, Inez	Moore Clinic	Muncie, Ind.

IOWA

Anderberg, M. P.***	2919 Grandview Blvd.	Sioux City, Iowa
Edwards, Dorothy M.	Iowa Methodist Hospital	Des Moines, Iowa
Ewer, Bertha A.	401 Security Bldg.	Sioux City, Iowa
Falk, Florence C.	417 Sioux Apartments	Sioux City, Iowa
Flynn, Mrs. Mary E.	318 Linden Ave.	Waterloo, Iowa
Haug, Camilla	Lutheran Hospital	Fort Dodge, Iowa
Kiely, Ruth G.	St. Joseph's Mercy Hosp.	Sioux City, Iowa
Meyer, Marian L.	St. Joseph Mercy Hospital	Mason City, Iowa
Modaff, Louise	St. Joseph Mercy Hospital	Ft. Dodge, Iowa
Robson, Marie K.***	308 Toy Nat'l Bank Bldg.	Sioux City, Iowa
Ryan, Nell M.***	308 Ida Apts.	Sioux City, Iowa
Sister M. M. Kane	St. Joseph Mercy Hospital	Sioux City, Iowa
Sister Mary Y. Jenn	St. Anthony Hospital	Carroll, Iowa
Schwarting, Louise	Lutheran Hospital	Ft. Dodge, Iowa
Smith, Ethel	517 High Ave., E.	Oskaloosa, Iowa
Thompson, Helen M.	212 Ankeny Bldg.	Clinton, Iowa
Wright, Ruth	Burlington Hospital	Burlington, Iowa

KANSAS

Ackerman, Edith		
Baker, Viola H.	Wesley Hospital	Wichita, Kansas
Lamping, Clare	Wm. Newton Mem'l Hospital	Winfield, Kansas
Paul, Mrs. Ethel S.	Wesley Hospital	Wichita, Kansas
Peterson, Mrs. L.***		Miller, Kansas
West, Wanda G.	Community Hospital	Beloit, Kansas

KENTUCKY

Bloom, Estelle	822 Heyburn Bldg.	Louisville, Ky.
Duggar, Charlotte	Frontier Nursing Serv. Hosp.	Hyden,Leslie Co.,Ky.
Haverkamp, Etta***	217 Van Voast Ave.	Bellevue, Ky.
Salt, Susan R.***	641 Park Ave.	Newport, Ky.
Smith, Tommie	1110 Francis Bldg.	Louisville, Ky.
Woody, Marg. L., Mrs.	1026 S. 4th St., Apt. 21	Louisville, Ky.

LOUISIANA

Dorweiler, Margaret	U. S. Marine Hospital	New Orleans, La.
Gebs, Lillian M.	Charity Hospital	New Orleans, La.
Grillet, Agnes	628 Fern St.	New Orleans, La.
Grillet, Stella	628 Fern St.	New Orleans, La.
Hamsey, Sarah A.	365 Church St.	Baton Rouge, La.
Hauswald, Antoinette A.	Hotel Dieu	New Orleans, La.
Koenig, Mary E.	Charity Hospital	New Orleans, La.
Rhodes, Sue	1821 Orleans St.	New Orleans, La.
Simoneaux, Lise	Ellender Mem'l Hospital	Houma, La.
Wever, Mertice McL.	2606 Prytonia	New Orleans, La.
Sister Mary A. Younge	St. Francis Sanitarium	Monroe, La.

MAINE

Chaney, Mrs. Ardell M.	St. Barnabas Hospital	Portland, Me.
Denton, Helen G.		Caribou, Me.
Greene, Gretchen V.	Eastern Maine Gen'l Hospital	Bangor, Me.
Greenleaf, Lona M.	Mt. Desert Island Hospital	Bar Harbor. Me,
Roy, Lillian B.	Maine General Hospital	Portland, Me.

MARYLAND

Argus, Clara	Johns Hopkins Hospital	Baltimore, Md.
Berger, Olive L.	Johns Hopkins Hospital	Baltimore, Md.
Black, Mrs. C.***	So. Baltimore Gen'l Hospital	Baltimore, Md.
Carl, Dorothy M.***	4309 Chatham Road	Baltimore, Md.
Elliott, Ruth S.	S. Baltimore Gen'l Hospital	Baltimore, Md.
Hoyt, Margaret L.	Washington San. and Hospital	Takoma Park, Md.
Furlong, Rose L.	Johns Hopkins Hospital	Baltimore, Md.
Kavanagh, Mary T.	St. Joseph's Hospital	Baltimore, Md.
Mauk, Martha E.	229 Union St.	Cumberland, Md.
Nelson, Anna C.		Trappe, Md.
O'Brien, Mary J.	University Hospital	Baltimore, Md.
Owings, Frances V. N.	Johns Hopkins Hospital	Baltimore, Md.
Richardson, Virginia L.	831 N. Washington St.	Baltimore, Md.
Sinkler, Elsie B.	Johns Hopkins Hospital	Baltimore, Md.
Smith, Grace N.	Johns Hopkins Hospital	Baltimore, Md.
South, Genevieve A.	Sinai Hospital	Baltimore, Md.
Tyler, Amelia L.	Peninsula General Hospital	Salisbury, Md.
Weick, Anna M.	U. S. Marine Hospital	Baltimore, Md.
Welker, Marianne H.	Johns Hopkins Hospital	Baltimore, Md.
White, Mary A.	Johns Hopkins Hospital	Baltimore, Md.

MASSACHUSETTS

Bliss, Jessie M.	Quincy City Hospital	Quincy, Mass.
Bond, Mrs. Helen L.***	46 Linden St.	Everett, Mass.
Coffin, Hazel S.	28 Hancock St.	Boston, Mass.
Eagles, Beatrice C.	St. Luke's Hospital	New Bedford, Mass
Gerrard, Gertrude M.	Peter Bent Brigham Hospital	Boston, Mass.
Gorman, Mrs.Ada Terry	117 Park Drive	Boston, Mass.
Haigwood, Hattie B.	U. S. Marine Hospital	Chelsea, Mass.
Hansbrough, Elizabeth	Station Hospital	Ft. Banks, Winthrop, Mass.
Hodgins, Agatha C.	Bridge St.	Chatham, Cape Cod., Mass.
Kirby, Mrs. Matilda F.	Russell's Mills Road	N. Dartmouth, Mass.
Lank, Betty E.	Children's Hospital	Boston, Mass.
Lewis, Dilys A.	Harrington Mem'l Hospital	Southbridge, Mass.
Macfadden, Shamah N.	Leominister Hospital	Leominster, Mass.
MacKichan, Kath. Eva	Salem Hospital	Salem, Mass.
MacRae, Elizabeth F.	Peter Bent Brigham Hospital	Boston, Mass.
Mosher, Faye R.	11 Park Drive	Boston, Mass.
Rudkin, Margaret F.	70 Pearl St.	Reading, Mass.
Rupert, Cecile	34 N. Summer St.	Adams, Mass.
Sawyer, Myra L.	Waltham Hospital	Waltham, Mass.
Stevens, Louise A.	219 Clark Road	Brookline, Mass.
Sword, Esther	Shriners Hospital for Crippled Children	Springfield, Mass.

MICHIGAN

Allison, Clara E.	Nichols Hospital	Battle Creek, Mich.
Baird, Lillian G.	University Hospital	Ann Arbor, Mich.
Barron, Loretta	Leila Y. Post Hospital	Battle Creek, Mich.
Blue, Margaret E.	Mercy Hospital	Benton Harbor,Mich.
Colborn, Lucy B.	Mercy Hospital	Cadillac, Mich.
Cote, Angela B.	1298 Fourth St.	Muskegon, Mich.
Courtney, Mabel E.	235 E. Alexandrine Ave.	Detroit, Mich.
Crosby, Alice C.	W. A. Foote Mem'l Hospital	Jackson, Mich.
Currie, Laurel M.***	732 S. Green St.	Detroit, Mich.
Dow, Verna E.	University of Mich. Hospital	Ann Arbor, Mich.
Fletcher, Mamie J.	Receiving Hospital	Detroit, Mich.
Fox, Mrs.McChesney***	Box 43	Bronson, Mich.
French, Bessie May	Women's Hospital	Flint, Mich.
Galbraith, A. Maude	212 Antisdel Pl., N.E.	Grand Rapids, Mich.
Gariepy, Mary	University of Michigan Hosp.	Ann Arbor, Mich.
Goode, Margaret T.	American Legion Hospital	Battle Creek, Mich.
Greenway, Emma	Receiving Hospital	Detroit, Mich.
Hill, Maude	81 Franklin St.	Houghton, Mich.
Howard, Florence C.	Woman's Hospital	Detroit, Mich.
Ilgenfritz, Esther Louise	St. Joseph's Mercy Hospital	Pontiac, Mich.
Kempers, Norma C.	University Hospital	Ann Arbor, Mich.
Kempton, Christine B.	Florence Crittenton Hospital	Detroit, Mich.
Kinloch, Dorothy C.	Receiving Hospital	Detroit, Mich.
Koshel, Ann M.		
Krewson, Josephine E.	Mercy Hospital	Muskegon, Mich.
Long, Florence H.	Saginaw General Hospital	Saginaw, Mich.
McGinley, Rose M.	Leila Y. Post Montg. Hosp.	Battle Creek, Mich.
McKnight, Mary T.	Saginaw General Hospital	Saginaw, Mich.
McMullen, Mary	Gerber Memorial Hospital	Fremont, Mich.
Martin, Mary Sturgeon	218 Ferris St.	Ypsilanti, Mich.
Meil, Esther J.	Henry Ford Hospital	Detroit, Mich.
Moir, Ethel M.	Henry Ford Hospital	Detroit, Mich.
Myers, Gertrude	St. Mary's Hospital	Detroit, Mich.
Perry, Mae A.	Goodrich General Hospital	Goodrich, Mich.

Sister Alphonse Liguori	St. Joseph Sanitarium	Mt. Clemens, Mich.
Sister M. C. Steffes	Borgess Hospital	Kalamazoo, Mich.
Sister M. A. Leenders	St. Francis Hospital	Escanaba, Mich.
Sister Mary J. Rice.	St. Mary's Hospital	Grand Rapids, Mich.
Sister M.Lorraine Tobin	Mercy Hospital	Manistee, Mich.
Sister M.Stella Kearney	St. Mary's Hospital	Grand Rapids, Mich.
Schoonbeck, Mrs. B. S.		Plainwell, Mich.
Simco, Mrs. Josephine	Woman's Hospital	Detroit, Mich.
Smith, Mary B.	Receiving Hospital	Detroit, Mich.
Snider, Ada	Florence Crittendon Hospital	Detroit, Mich.
Stephens, Alice L.	Wyandotte Gen'l Hospital	Wyandotte, Mich.
Sturgeon, Eleanor R.	Univ. of Michigan Hospital	Ann Arbor, Mich.
Taylor, Jeanette		
Teal, Bernice R.	University of Michigan Hosp.	Ann Aabor, Mich.
Walsh, Jean A.	Providence Hospital	Detroit, Mich.
Wessinger, Ione	Henry Ford Hospital	Detroit, Mich.
Wood, Mrs. Priscilla B.	1456 Lake Blvd.	St. Joseph, Mich.

MINNESOTA

Anderson, Alice L.	Minneapolis General Hospital	Minneapolis, Minn.
Anderson, Palma A.	Lutheran Deaconess Hospital	Minneapolis, Minn.
Baer, Maple A.	St. John's Hospital	St. Paul, Minn.
Budlong, Charlotte C.	New Asbury Hospital	Minneapolis, Minn.
Clayton, Lillian Berg	University Hospital	Minneapolis, Minn.
Cleary, Kathleen M.	St. Luke's Hospital	St. Paul, Minn.
Conlon, Theresa B.	Gillette State Hospital	St. Paul, Minn.
Eyk, Helen E.	Montevideo Hospital	Montevideo, Minn.
Filla, Julia	Chas. T. Miller Hospital	St. Paul, Minn.
Flaten, Olga	Stevens County Hospital	Morris, Minn.
Gaertner, Elizabeth L.	St. Mary's Hospital	Minneapolis, Minn.
Goblirsch, Agnes C.	1027 N. German St.	Montevideo, Minn.
Grebstad, Borghild	Northwestern Hospital	Minneapolis, Minn.
Gronvold, J. Marie	St. Joseph's Hospital	St. Paul, Minn.
Hallberg, Caroline B.	Northwestern Hospital	Minneapolis, Minn.
Hoseth, Petrine	St. Barnabas Hospital	Minneapolis, Minn.
Hutcheon, Mary Ethel	Winona General Hospital	Winona, Minn.
Jons, Elizabeth S.	Mayo Clinic	Rochester, Minn.
Jurgensen, Katharine D.	Swedish Hospital	Minneapolis, Minn.
Kalstrom, Clarice S.		Milan, Minn.
Kippen, Janet	Asbury Hospital	Minneapolis, Minn.
Koch, Dorothy L.	Minneapolis Gen'l Hospital	Minneapolis, Minn.
Lemke, Pearl F.	University of Minnesota Hosp.	Minneapolis, Minn.
Little, L. Rose**	Minneapolis Gen'l Hospital	Minneapolis, Minn.
McCrary, Opal E.	Midway Hospital	St. Paul, Minn.
Malloy, Catherine	Eitel Hospital	Minneapolis, Minn.
Matthews, Mildred M.	Abbott Hospital	Minneapolis, Minn.
Mirick, Grace	Miller Hospital	Duluth, Minn.
Nelson, Orilla H.	St. Barnabas Hospital	Minneapolis, Minn.
Nickels, Christine	Swedish Hospital	Minneapolis, Minn.
Nordquist, Anna S.	Abbott Hospital	Minneapolis, Minn.
Peterson, Hazel J.	Fairview Hospital	Minneapolis, Minn.
Rau, Magdalene M.	St. John's Hospital	St. Paul, Minn.
Risse, Mayme J.	St. John's Hospital	Red Wing, Minn.
Root, Mable G.	University Hospital	Minneapolis, Minn.
Rosengren, Myrtle E.	Shriner's Hospital	Minneapolis, Minn.
Sister M. Cornelia Lee	St. Francis Hospital	Breckenridge, Minn.
Sister C. Pepmeier	St. Lucas Deaconess Hospital	Faribault, Minn.
Sister M. Loyola Nolan	St. Gabriel's Hospital	Little Falls, Minn.
Sister M. Xavier Reeves	St. Vincent's Hospital	Crookston, Minn.
Slattendale, Julo A.	University Hospital	Minneapolis, Minn.

Snobeck, Selma Mae	3720—13th Ave. South	Minneapolis, Minn.
Swenson, Nora V.	Swedish Hospital	Minneapolis, Minn.
Toomey, Martha M.	St. Mary's Hospital	Duluth, Minn.
Vig, Gusta	Fairview Hospital	Minneapolis, Minn.
Westly, Grethe S.	Deaconess Hospital	Minneapolis, Minn.
Zilisch, Serena M.*	Chas. T. Miller Hospital	St. Paul, Minn.
MISSISSIPPI		
Angland, Margaret	So. Miss. Charity Hospital	Laurel, Miss.
Bramlitt, Mrs. Jamie		Oxford, Miss.
Easterling, Emma*	Vicksburg Clinic	Vicksburg, Miss.
Francis, Louise	Clarksdale Hospital	Clarksdale, Miss.
Hatchett, Harriet S.	Fite Hospital	Columbus, Miss.
Mason, Mrs. Irene		Greenville, Miss.
Mullen, Catherine L.	Kings Daughters Hospital	Brookhaven, Miss.
Owen, Mrs. Sam**	Geo. C. Hixon Mem'l Hospital	Electric Mills, Miss.
Varnado, Maude	Laurel General Hospital	Laurel, Miss.
MISSOURI		
Buenger, Viola M.	206 Washington St.	St. Charles, Mo.
Cole, Sylvia C.*	Jewish Hospital	St. Louis, Mo.
Cox, Anna	Missouri Baptist Hospital	St. Louis, Mo.
Frein, Cecilia	St. John's Hospital	St. Louis, Mo.
Gay, Reva	5428 Delmar	St. Louis, Mo.
Gettinger, Anna L.	1621 Grattan	St. Louis, Mo.
Gettinger, Rose H.	St. Mary's Hospital	St. Louis, Mo.
Grupp, Doris M.	530 N. Union	St. Louis, Mo.
Hoffman, Mary L.	De Paul Hospital	St. Louis, Mo.
Huff, Verda Kemp	16 North Monroe St.	Carrollton, Mo.
Koehler, Emma M.	Robert Koch Hospital	Koch, Mo.
Lamb, Helen	Barnes Hospital	St. Louis, Mo.
Lindsey, Jessie	4468 Forest Park Blvd.	St. Louis, Mo.
McNellis, Mary M.	Barnes Hospital	St. Louis, Mo.
Marcum, Edith**	216 S. Kings Highway	St. Louis, Mo.
Martin, Lois Webster	City Hospital No. 1	St. Louis, Mo.
Miller, Ella M.	Station Hospital	Jefferson Barracks, Mo.
Newman, Beatrice M.	St. Luke's Hospital	St. Louis, Mo.
Rhodes, Lois L.	Barnes Hospital	St. Louis, Mo.
Sister M. C. Vogel***	St. Anthony's Hospital	St. Louis, Mo.
Sister Frieda L. Eckoff	Deaconess Hospital	St. Louis, Mo.
Sieg, Hattie C.	De Paul Hospital	St. Louis, Mo.
Slasor, Zelle	1600 Professional Bldg.	Kansas City, Mo.
Spleth, Frieda W.	Missouri Baptist Hospital	St. Louis, Mo.
Thompson, Edith L.	4515 Lindell Blvd.	St. Louis, Mo.
MONTANA		
Graham, Helen C.	415 E. Main St.	Missoula, Mont.
Hall, Annie J.	Deaconess Hospital	Great Falls, Mont.
Sister Mary Charles	Holy Rosary Hospital	Miles City, Mont.
Sister E. de Tivoli	St. Patrick Hospital	Missoula, Mont.
Sister M. H. Dugrenier	Columbus Hospital	Great Falls, Mont.
Sister Mary Fanahan***	Holy Rosary Hospital	Miles City, Mont.
Sister Mary Irene	Columbus Hospital	Great Falls, Mont.
Sister M. Richard	Holy Rosary Hospital	Miles City, Mont.
Sister Mary Theophana	Columbus Hospital	Great Falls, Mont.
Sister Victor	St. Patrick Hospital	Missoula, Mont.
Sister Rachel Rausch	St. John's Hospital	Helena, Mont.
Sister Mary William	Holy Rosary Hospital	Miles City, Mont.
Snyder, Myrta E.	Deaconess Hospital	Glasgow, Mont.
Winter, Mrs. Olive E.	401 S. Lake Ave.	Miles City, Mont.

NEBRASKA

Anderson, Marie S.	Immanuel Deaconess Hospital	Omaha, Nebr.
Bennett, Dolly M.	Bryan Mem'l Hospital	Lincoln, Nebr.
Bredenberg, Dorothy O.	St. Joseph's Hospital	Omaha, Nebr.
Brogan, Ellen	St. Elizabeth's Hospital	Lincoln, Nebr.
Bulin, Ada		Scottsbluff, Nebr.
Casey, Edith M.***	824 N. 43rd St.	Omaha, Nebr.
Dorsey, Josephine J.	Nicholas Senn Hospital	Omaha, Nebr.
Dugan, Elizabeth I.	St. Joseph's Hospital	Omaha, Nebr.
Ganzel, Charlotte A.	Nicholas Senn Hospital	Omaha, Nebr.
Hain, Agnes G.**	Bishop Clarkson Mem'l Hosp.	Omaha, Nebr.
Johnson, Hazelle	Creighton Mem'l St.Jos. Hosp.	Omaha, Nebr.
Miller, Lillian***	Roche Hospital	Sidney, Nebr.
Nelson, Leona K.	Methodist Episcopal Hospital	Omaha, Nebr.
Omig, Ruth E.	3480 Larimore Ave.	Omaha, Nebr.
Owens, Mrs. Mabel R.	Immanuel Deaconess Institute	Omaha, Nebr.
Peterson, Edith L.	Evangelical Covenant Hosp.	Omaha, Nebr.
Peterson, Edith S.	Military Avenue Hospital	Fremont, Nebr.
Rice, Irene B.	Odell Gen'l Hospital	Odell, Nebr.
Ritcher, Hazel H.	Bryan Mem'l Hospital	Lincoln, Nebr.
Sister M. Asella*	St. Elizabeth Hospital	Lincoln, Nebr.
Sister M. Cresentia	St. Elizabeth Hospital	Lincoln, Nebr.
Sister M. K. Corcoran	St. Catherine's Hospital	Omaha, Nebr.
Sister M. S. Kellogg	St. James' Orphanage	Omaha, Nebr.
Sister M. T. Bannon	St. Catherine Hospital	Omaha, Nebr.
Sister Mary Ursula	St. Mary's Hospital	Nebraska City, Nebr.
Schollman, Mrs. Amanda M.***	Evang. Covenant Hospital	Omaha, Nebr.
Shaffer, Anna May	Nebraska M. E. Hospital	Omaha, Nebr.
Svoboda, Kathryn C.	Nicholas Senn Hospital	Omaha, Nebr.
Woodgate, Marie E.	109 West 7th St.	North Platte, Nebr.

NEW HAMPSHIRE

Chisholm, Winnifred S.	Lucy Hastings Hospital	Manchester, N. H.
Pederson, Carin H.	New Hampshire Ml. Hospital	Concord, N. H.
Thompson, Vera L.	Margaret Pillsbury Hospital	Concord, N. H.

NEW JERSEY

Aberg, Harriet L.	Muhlenberg Hospital	Plainfield, N. J.
Bond, Hester	Presbyterian Hospital	Newark, N. J.
Bowles, Nancy M.	Hospital of St. Barnabas	Newark, N. J.
Bryant, Laura	Cooper Hospital	Camden, N. J.
Carruthers, A. H.***	Bayonne Hospital	Bayonne, N. J.
Cook, Maud M.	Presbyterian Hospital	Newark, N. J.
Cummings, Marion	Franklin Hospital	Franklin, N. J.
Dangler, Jessie M.	The Dr. E. C. Hazard Hospital	Long Branch, N. J.
Dangler, Leona	The Dr. E. C. Hazard Hospital	Long Branch, N. J.
Farmer, Mrs. E. H.***	7 Blake Ave.	Cranford, N. J.
Gilmore, Phyllis	Presbyterian Hospital	Newark, N. J.
Hathaway, Belle	Cooper Hospital	Camden, N. J.
Hawk, Eleanor Reid	Newark Mem'l Hospital	Newark, N. J.
Holcombe, Mrs. E. M.	780 Broadway	Newark, N. J.
Horne, M. Catherine	929 Revere Ave.	Trenton, N. J.
Logan, Della	Cooper Hospital	Camden, N. J.
Loyd, Belle	Overlook Hospital	Summit, N. J.
McGarry, Helen M.	Morristown Mem'l Hospital	Morristown, N. J.
Maunsell, Wilma	Beth Israel Hospital	Newark, N. J.
Myers, Martha M.	Eye & Ear Infirmary	Newark, N. J.
Nash, Ruth M.	Muhlenberg Hospital	Plainfield, N. J.
Patterson, Mary A.	Cooper Hospital	Camden, N. J.

Patterson, Pearl C.	Dr. E. C. Hazard Hospital	Long Branch, N. J.
Reynolds, Harriet E.	Memorial Hospital	Morristown, N. J.
Sister M. B. Schumm	St. Francis American Hospital	Trenton, N. J.
Shoemaker, Susan B.	St. James Hospital	Newark, N. J.
Stone, Mae	Presbyterian Hospital	Newark, N. J.
Strandberg, Agnes P.	94 Washington Ave.	Carteret, N. J.
Strom, Ruth E.	211 So. Center St.	East Orange, N. J.
Sutton, Alberta	Box 86	Lake Hopatcong,N.J.
Thompson, Ora E.	Elizabeth General Hospital	Elizabeth, N. J.
Welch, Dorothy M.	Somerset Hospital	Somerville, N. J.

NEW YORK

Adrion, Pearl C.	Mary Immaculate Hospital	Jamaica, L. I., N. Y.
Agnew, Molly M.	149 Humber Ave.	Buffalo, N. Y.
Alber, Emma	City Hospital	Binghamton, N. Y.
Allen, Jeanette	Caledonia Hospital	Brooklyn, N. Y.
Anderson, Clara E.	Brooklyn Hospital	Brooklyn, N. Y.
Anderson, Mrs. Sally A.	Manhattan Eye, Ear, Nose and Throat Hospital	New York, N. Y.
Arent, Madeleine	Lawrence Hospital	Bronxville, N. Y.
Armstrong, Anna E.	Memorial Hospital	New York, N. Y.
Armstrong, Ethel	Cumberland Hospital	Brooklyn, N. Y.
Barry, Margaret	St. Mary's Hospital	Rochester, N. Y.
Beam, Henrietta May	147-37 Beech Ave.	Flushing, L. I., N. Y.
Bean, Verna E.	St. John's Hospital	Brooklyn, N. Y.
Bieber, Clara G.	Woman's Hospital	New York, N. Y.
Billmeyer, Hancie M.	Wyckoff Heights Hospital	Brooklyn, N. Y.
Blade, Caroline E.	4802 10th Ave.	Brooklyn, N. Y.
Blanchard, Hazel**	1910 Seventh Ave.	Troy, N. Y.
Bush, Genevieve C.	Albany Hospital	Albany, N. Y.
Calder, Dorothy N.	Yonkers General Hospital	Yonkers, N. Y.
Clode, Mrs. Mary	161 Emerson Place	Brooklyn, N. Y.
Cough, Dorothy	Post-Graduate Hospital	New York, N. Y.
Colleran, Emma A.	Ellis Hospital	Schenectady, N. Y.
Collins, Agnes G.	1320 York Ave.	New York, N. Y.
Conway, Helen A.	Flushing Hospital	Flushing, L. I., N. Y.
Cook, Kate	Brooklyn Hospital	Brooklyn, N. Y.
Cook, Mildred	Coney Island Hospital	Brooklyn, N. Y.
Craven, Helen K.	City Hospital, Welfare Island	New York, N. Y.
Cullen, Catherine C.	Arnot-Ogden Mem'l Hospital	Elmira, N. Y.
Danzeisen, Mrs. E. W.	Midtown Hospital	New York, N. Y.
DeBaun, Faith	Hudson City Hospital	Hudson, N. Y.
deGraaf, Hermine***	Queens General Hospital	Jamaica, L. I., N. Y.
de Noyelles, Mae Heath	St. John's Riverside Hospital	Yonkers, N. Y.
Desmond, Mary	North Country Com'y Hosp.	Glen Cove, L.I., N.Y.
Dickson, Eva M.	Brooklyn Hospital	Brooklyn, N. Y.
Dobbie, Marie P.	63 N. Hampton St.	Buffalo, N. Y.
Dolce, Mildred R.	Buffalo City Hospital	Buffalo, N. Y.
Donaher, May G.	1845 Becker St.	Schenectady, N. Y.
Doran, Irene	Shelton Hotel	New York, N. Y.
Doty, Louise V.***	Brooklyn Hospital	Brooklyn, N. Y.
Dunst, Elizabeth	Samaritan Hospital	Brooklyn, N. Y.
Edwards, Ida Maude*	Strong Mem'l Hospital	Rochester, N. Y.
Edwards, Mrs. P. H.***	1240 Pacific St.	Brooklyn, N. Y.
Elzer, Josephine	French Hospital	New York, N. Y.
Eveleth, Grace S.	337 East 30th St.	New York, N. Y.
FitzGerald, Sarah L.	St. Mary's Hospital	Rochester, N. Y.
Fitzpatrick, M. S.	Mary McClellan Hospital	Cambridge, N. Y
Flanagan, Mrs. H. G.***	Chenango Mem'l Hospital	Norwich, N. Y.
Fowler, Sophie K.	400 Clinton Ave.	Brooklyn, N. Y

Franke, Elsa E.	1484 Glenwood Blvd.	Schenectady, N. Y.
Gardner, Reba H.	Mt. Sinai Hospital	New York, N. Y.
Geiss, Helen M.	Strong Memorial Hospital	Rochester, N. Y.
Glenz, Muriel M.	Minor Surg. Nursing Service	Hempstead, L.I., N.Y.
Graham, Ada M.	141 W. 109th St.	New York, N. Y.
Haubennestel, Ruth	Vassar Bros. Hospital	Poughkeepsie, N. Y.
Hedling, Frieda K.	Beth-El Hospital	Brooklyn, N. Y.
Heinz, Martha C.***	Grasslands Hospital	Valhalla, N. Y.
Hendrickson, Grace L.	Meadowbrook Hospital	Hempstead, L.I., N.Y.
Henneberger, Martha M.	Woman's Hospital	New York, N. Y.
Hess, Frances	Long Island College Hospital	Brooklyn, N. Y.
Hoge, Esther H.	706 West 168th St.	New York, N. Y.
Hughes, Grace Gordon	Woman's Hospital	New York, N. Y.
Hunt, Christine M.	Coney Island Hospital	Brooklyn, N. Y.
Jenne, Mary A.	Leonard Hospital	Troy, N. Y.
Jennings, Gertrude M.	New Rochelle Hospital	New Rochelle, N. Y.
John, Grace M.	Cornell Medical Center	New York, N Y.
Johnston, Maude	246 Ovington Ave.	Brooklyn, N. Y.
Jones, Deborah	Albany Hospital	Albany, N. Y.
Jones, Marion***	104 McAllister Ave.	Syracuse, N. Y.
Keller, Bessie M.	Cumberland Hospital	Brooklyn, N. Y.
Kendall, Mildred M.	Strong Mem'l Hospital	Rochester, N. Y.
Kent, Bernice***	148 E. 32nd St.	Brooklyn. N. Y.
Kingman, Katherine	Albany Hospital	Albany, N. Y.
Korenik, Boldiena A.	Jamaica Hospital	Richmond Hill, L.I.
Krieger, Bessie L.	103 Hooker Ave.	Poughkeepsie, N. Y.
Kuhn, Charlotte	Crown Heights Hospital	Brooklyn, N. Y.
Lang, Veronica E.	St. Catherine's Hospital	Brooklyn, N. Y.
Lemke, Anna C.	Woman's Hospital	New York, N. Y.
Lindberg, Gladys L.	Staten Island Hospital	Staten Island, N. Y.
Lipinski, Bernice	Strong Memorial Hospital	Rochester, N. Y.
Lynch, Eunice	Mather Hospital	Port Jefferson, N. Y.
MacEachron, Doris H.	Albany Hospital	Albany, N. Y.
McCoy, Charlotte	1320 York Ave.	New York, N. Y.
McFadden, Dessie	1320 York Ave.	New York, N. Y.
MacIver, Kathryn M.	Bay Ridge Sanitarium	Brooklyn. N. Y.
McKay, Cora	Albany Hospital	Albany, N. Y.
McMullen, Julia	Ellis Hospital	Schenectady, N. Y.
McQuilton, Ida Mae	Nassau Hospital	Mineola, L. I., N. Y.
MacQuarrie, Barbara	New York Hospital	New York, N. Y.
Marines, Anna V.***	Jewish Hospital	New York, N. Y.
Mavor, Mary E.	N .Y. Orthopedic Hospital	Brooklyn, N. Y.
Meek, Mary A.	1255 Delaware Ave.	Buffalo, N. Y.
Merkle, Louise R.	311 E. 72nd St.	New York, N. Y.
Mitarnowski, Lillian A.	Kings County Hospital	Brooklyn, N. Y.
Moore, Greta	Mem'l Hospital of Greene Co.	Catskill, N. Y.
Morrow, Dorothy H.	Highland Hospital	Rochester, N. Y.
Moss, Naomi S.	Wyckoff Heights Hospital	Brooklyn, N. Y.
Mulcox, Mildred G.	St. Mary's Hospital	Brooklyn, N. Y.
Mullin, Sara R.	New York Hospital	New York, N. Y.
Murphy, Anna D.	Ellis Hospital	Schenectady, N. Y.
Norris, Anna V.	United Hospital	Port Chester, N. Y.
O'Connor, Inez E.	Olean General Hospital	Olean, N. Y.
O'Neill, Anna T.	4810 Tenth Ave.	Jamaica, L. I., N. Y.
Patten, Helen L.	62 Chestnut St.	Cohoes, N. Y.
Penland, Anne	Presbyterian Hospital	New York, N. Y.
Perry, Mary F.	309 E. 49th St.	New York, N. Y.
Peters, Mrs. H. U.***	R. F. D.	Gowanda, N. Y.
Plumb, Elizabeth R.	City Hospital, Welfare Island	New York, N. Y.
Prentice, Mildred V.	Bethany Deaconess Hospital	Brooklyn, N. Y.

Rabinowitz, Frances	Staten Island Hospital	Tomkinsv., S.I., N.Y.
Racette, Alice M.	Ellis Hospital	Schenectady, N. Y.
Rees, Madge	Ellis Hospital	Schenectady, N. Y.
Reusch, Edith M.	Reconstruction Unit, 395 Central Park West	New York, N. Y.
Rice, Lillian A.	39 Palmer Ave., Box 216	Bronxville, N. Y.
Riebhoff, Grace H.	Freeport Hospital	Freeport, L. I., N. Y.
Roach, Evelyn	1320 York Ave.	New York, N. Y.
Robinson, Helen B.	Queen's General Hospital	Jamaica, L. I., N. Y.
Russell, Jessie G.	567 Prospect Place	Brooklyn, N. Y.
Russell, M. Mabel	Potsdam Hospital	Potsdam, N. Y.
Sister M. Agnes Gabriel	St. Catherine's Hospital	Brooklyn, N. Y.
Sister M. Inez O'Mailia	Mercy Hospital	Buffalo, N. Y.
Sister M. Nazarene***	Mary Immaculate Hospital	Jamaica, L. I., N. Y.
Satterlee, Charlotte D.	Memorial Hospital	Albany, N. Y.
Savage, Anne	Brooklyn Hospital	Brooklyn, N. Y.
Schmid, Carol	880 Lafayette Ave.	Buffalo, N. Y.
Schoch, Icie A.	North Country Comm'y Hosp.	Glen Cove, N. Y.
Secrest, Clara M.	Homer Folks Hospital	Oneonta, N. Y.
Shupp, Miriam G.	Strong Memorial Hospital	Rochester, N. Y.
Silverman, Helen E.	70 Remsen St., Apt. 10D	Brooklyn, N. Y.
Smith, Caroline B.	Vassar Bros. Hospital	Poughkeepsie, N. Y.
Spongberg, Alice J.	Bay Ridge Sanitarium	Brooklyn, N. Y.
Starchak, Mary	Brooklyn Hospital	Brooklyn, N. Y.
Steffen, Gertrude	Long Island College Hospital	Brooklyn, N. Y.
Stewart, Anna E.	Manhattan Eye, Ear & Throat Hospital	New York, N. Y.
Suhrhoff, Marion A.	Midwood Sanitarium	Brooklyn, N. Y.
Sutliff, Dorothy S.	Mary Imogene Bassett Hospital	Cooperstown, N. Y.
Tippit, Clyde D.	455 W. 34th St.	New York, N. Y.
Tschudin, Marie	Vassar Bros. Hospital	Poughkeepsie, N. Y.
von Bockum-Dolffs, I.	Hospital for Ruptured & Crippled	New York, N. Y.
Vornholt, Anna L.	Manhattan Eye, Ear & Throat Hospital	New York, N. Y.
Ward, Gladys	Jewish Hospital	Brooklyn, N. Y.
Wark, Marion K.***	Jewish Hospital	Brooklyn, N. Y.
Weaver, R. Edith	Hudson City Hospital	Hudson, N. Y.
Weisensee, Barbara	Minor Sur. Nursing Service	Hempstead, L.I.,N.Y.
Whitman, Georgia	89-06 163rd St.	Jamaica, L. I., N. Y.
Wright, Anne M.	Nassau Hospital	Mineola, L. I., N. Y.
Wright, Regina	506 6th St.	Brooklyn, N. Y.
Wurtz, Clara A.	200 Wallace Ave.	Buffalo, N. Y.
Yoskey, Julia A.	New York Hospital	New York, N. Y.
Ziegler, Martha T.	Kings Co. Hosp.	Brooklyn, N. Y.

NORTH CAROLINA

Baird, Ida L.	Highsmith Hospital	Fayetteville, N. C.
Derrick, Ora	James Walker Mem'l Hospital	Wilmington, N. C.
Dowd, Nova J.	Rex Hospital	Raleigh, N. C.
Fleming, Maude M.	Box 327	Louisburg, N. C.
Goodman, Eliza D.	Duke University Hospital	Durham, N. C.
Henley, Jamie	Ellen Fitzgerald Hospital	Monroe, N. C.
Knight, Edna	Rex Hospital	Raleigh, N. C.
Muller, Mary H.	Duke University Hospital	Durham, N. C.
Scarborough, Mante	Presbyterian Hospital	Charlotte, N. C.
Sellars, Bessie L.	416 Front St.	Burlington, N. C.
Snively, Mary Helen	P. O. Box 3610	Durham, N. C.
Trent, Frances L.	N. C. Orthopedic Hospital	Gastonia, N. C.

NORTH DAKOTA

Ammentorp, Magna	Deaconess Hospital	Grand Forks, N. D.
Engen, Christine G.	Trinity Hospital	Minot, N. D.
Ginther, Winifred	St. Michael's Hospital	Grand Forks, N. D.
La Valla, Margaret	Quain & Ramstad Clinic	Bismarck, N. D.
Lyngstad, Charlotte	Quain & Ramstad Clinic	Bismarck, N. D.
Muccilli, Janette E.	Good Samaritan Hospital	Williston, N. D.
Sister Et. Eliz. Heyn	St. Michael's Hospital	Grand Forks, N. D.
Sister M. Camillus	Mercy Hospital	Valley City, N. D.
Sister M. D. Swoboda	Trinity Hospital	Jamestown, N. D.
Sister Mary Dolorosa	Mercy Hospital	Devils Lake, N. D.
Sister G. Delmore	St. John's Hospital	Fargo, N. D.
Sogaard, Gertrude	St. Luke's Hospital	Fargo, N. D.

OHIO

Adams, Lou E.	Cleveland Clinic Hospital	Cleveland, Ohio
Allen, Lola	Children's Hospital	Cincinnati, Ohio
Allison, Mary	University Hospitals	Cleveland, Ohio
Allwein, Aida B.	Mount Sinai Hospital	Cleveland, Ohio
Angwin, Lillian	Glenville Hospital	Cleveland, Ohio
Auble, Mada C.	1613 Home Savings & Loan Bldg.	Youngstown, Ohio
Barnett, Florence M.	Glenville Hospital	Cleveland, Ohio
Barth, Alice L.*	Youngstown Hospital Ass'n, N. S. Unit	Youngstown, Ohio
Beros, Anna E.***	Cor. 4th and Belmont Sts.	Toronto, Ohio
Boswell, Florence H.	1334 Inglewood Drive	Cleveland, Ohio
Burlage, Katherine G.	660 Johnson Ave.	Bedford, Ohio
Callott, Henriette May	10120 Wilbur Ave.	Cleveland, Ohio
Campbell, Violet	St. Elizabeth's Hospital	Youngstown, Ohio
Carlson, Mabel A.	Ft. Hamilton Hospital	Hamilton, Ohio
Case, Mrs. Loretta***	1886 E. 93rd St.	Cleveland, Ohio
Correll, Marion A.	Children's Hospital	Cincinnati, Ohio
Coughlin, Johanna M.	Good Samaritan Hospital	Dayton, Ohio
Crauder, Dona	107 Stockton Ave.	Dayton, Ohio
Dingledine, Margaret	325 North Robert Blvd.	Dayton, Ohio
Dougherty, Donna	University Hospitals	Cleveland, Ohio
Edwards, Grace M.	University Hospitals	Cleveland, Ohio
Eldredge, Mildred C.	Detwiler Mem'l Hospital	Wauseon, Ohio
Fife, Gertrude L.	University Hospitals	Cleveland, Ohio
Forsman, Rosalie Marie	Station C, Box 22	Cincinnati, Ohio
Gath, Mrs. Fanny E.	c/o B.Morgan, ManchesterRd.	Middletown, Ohio
Gibson, Frances	Cincinnati General Hospital	Cincinnati, Ohio
Gilby, Mrs. Mary M.	121 Mulberry St.	Lebanon, Ohio
Goodman, Mary Lucile	University Hospitals	Cleveland, Ohio
Graff, Ruth	University Hospitals	Cleveland, Ohio
Gruler, Imelda M.	Good Samaritan Hospital	Cincinnati, Ohio
Hale, Dessa C.	Hale Hospital	Wilmington, Ohio
Heckathorn, Helen M.	St. Thomas Hospital	Akron, Ohio
Hollister, Marian	University Hospitals	Cleveland, Ohio
Houghland, Mrs. L. P.	1932 E. 97th St., Suite 319	Cleveland, Ohio
Kaiser, Emilie	University Hospital	Columbus, Ohio
Lemke, Evelyn	Christ Hospital	Cincinnati, Ohio
Lupher, Marg. J.***	148 N. Main St.	Utica, Ohio
McAskill, Mary I.	1018 Union Central Bldg.	Cincinnati, Ohio
McCarthy, Dorothy C.	University Hospitals	Cleveland, Ohio
McDade, Mary A.	507 Alliance Bank Bldg.	Alliance, Ohio
McGilliard, Dorothy	223 N. Cooper Ave.	Lockland, Ohio
Maxwell, Mrs. Leona	City Hospital	Akron, Ohio
Momeyer, Myrn E.	St. Luke's Hospital	Cleveland, Ohio

Moore, Rae E.	Akron City Hospital	Akron, Ohio
Morgan, Martha A.	St. Ann's Hospital	Cleveland, Ohio
Nightengale, Ann M.**	Lutheran Hospital	Cleveland, Ohio
Parker, Daisy A.	Youngstown City Hospital, S. S. Unit	Youngstown, Ohio
Parrish, Elizabeth A.***	1322 Plum St.	Steubenville, Ohio
Pfeifer, Christine K.	Children's Hospital	Columbus, Ohio
Pfisterer, Dorothy	White Cross Hospital	Columbus, Ohio
Rathweg, Mary Ruth	2437 Catalpa Drive	Dayton, Ohio
Richards, Lucy E.	City Hospital	Cleveland, Ohio
Rothansky, Anna M.	Akron City Hospital	Akron, Ohio
Sister M. B. Leahy	Mercy Hospital	Hamilton, Ohio
Sister Mary J. Halter***	Mercy Hospital	Canton, Ohio
Sister M. M. Regan	Good Samaritan Hospital	Cincinnati, Ohio
Florence Sargeant	Akron City Hospital	Akron, Ohio
Sauers, Mildred	City Hospital	Cleveland, Ohio
Sheehan, Kay	Charity Hospital	Cleveland, Ohio
Sloat, Mildred R.	Ohio Valley Hospital	Steubenville, Ohio
Stevens, Alcey H.	Youngstown Hospital, S. S.	Youngstown, Ohio
Stillman, Mrs. Irene	7618 Dorothy Avenue	Cleveland, Ohio
Sutton, Bessie	City Hospital	Cleveland, Ohio
Thompson, Anne***	Huron Road Hospital	Cleveland, Ohio
Thompson, Elizabeth M.	Cleveland Clinic Hospital	Cleveland, Ohio
Tice, Pauline	Good Samaritan Hospital	Cincinnati, Ohio
Van Arsdale, Myra	St. Luke's Hospital	Cleveland, Ohio
Venn, Anna D.	Christ Hospital	Cincinnati, Ohio
Walker, Marjory H.	Mt. Sinai Hospital	Cleveland, Ohio
Walters, Martha	Mt. Sinai Hospital	Cleveland, Ohio
Ware, Mrs. Mary A. (Life Member)	Children's Hospital	Cincinnati, Ohio
Wass, Agnes A.	Woman's Hospital	Cleveland, Ohio
Webb, Alma	Cincinnati Gen'l Hospital	Cincinnati, Ohio
Wertz, E. Ruth	Good Samaritan Hospital	Cincinnati, Ohio
Whyte, Evalyn M.	University Hospitals	Cleveland, Ohio
Wilkes, Vernie M.	White Cross Hospital	Columbus, Ohio
Willey, Mary J.	Mt. Carmel Hospital	Columbus, Ohio

OKLAHOMA

Ball, Audra I.	U. S. Indian Service	Pawnee, Okla.
Gandy, Helen	Wesley Hospital	Oklahoma C'y, Okla.
Loftus, Julia D.**	Community Hospital	Elk City, Okla.
Parks, Mrs. E. McNiel	9265 Sixth Street	McAlister, Okla.
Selby, Georgiana	Masonic Hospital	Cushing, Okla.
Williams, Mrs. Phillip	1927 Main St.	Durant, Okla.

OREGON

Amort, Alvine	1312 Mill St.	Eugene, Ore.
Bunch, Josephine B.	117 N. W. Trinity Place	Portland, Ore.
Butler, Hazel	2166 N. W. Irving St.	Portland, Ore.
Byford, Jeannette	Good Samaritan Hospital	Portland, Ore.
Caraway, Olga L.***	R. 6, Box 772½	Portland, Ore.
Carter, Hazel P.	827 Williamette St.	Eugene, Ore.
Darby, Merwyn	St. Andrew's Hotel	Portland, Ore.
Davis, Mary E.	Salem Gen'l Hospital	Salem, Ore.
Dempsey, Anne	2062 N. W. Marshall St.	Portland, Ore.
Dimig, Mary K.	2800 N. Commercial Ave.	Portland, Ore.
Doerr, Aimee L.*	Multnomah Hospital	Portland, Ore.
Donley, Helene	Eugene Hospital and Clinic	Eugene, Ore.
Dow, Jean Edna	1908 E. Burnside St.	Portland, Ore.
Durno, Evelyne Baker	1913 Hillcrest Road	Medford, Ore.
Earhart, June	Route 4	Medford, Ore.

Feser, Anne	Medical Dental Surgery	Portland, Ore.
Fife, Marie	164 Hawthorn Ave.	Bend, Ore.
Fletcher, Mrs. Jessie C.	Box 65	Hillsdale, Ore.
Floren, Marie E.	Emmanuel Hospital	Portland, Ore.
Flynn, Mrs. Laura***	821 S. E. Bush St.	Portland, Ore.
Gammon, Edna C.	U. S. National Bank Bldg.	The Dalles, Ore.
Giddings, Margret	607 Medical Arts Bldg.	Portland, Ore.
Harris, Louise	6325 S. E. Morrison St.	Portland, Ore.
Haug, Emma	2800 N. Commercial Ave.	Portland, Ore.
Herin, Miriel	Emanuel Hospital	Portland, Ore.
Hockett, Mrs. Faye W.	Good Samaritan Hospital	Portland, Ore.
Hollenbeck, Alta	Good Samaritan Hospital	Portland, Ore.
Johnson, Eliz. D.***	2005—28th St.	Milwaukie, Ore.
McCorkle, Mrs. Clara	Hood River Hospital	Hood River, Ore.
McDonald, Lillian M.	Salem General Hospital	Salem, Ore.
McDonald, Helen J.	Hillside Hospital	Klamath Falls, Ore.
McElligott, Mabel	4705 N. E. Mallory Ave.	Portland, Ore.
McGee, Agnes	2328 N. W. Everett St.	Portland, Ore.
Maher, Bernice**	2475 N. W. Westover Road	Portland, Ore.
Morse, Cecile L.	Mid-Columbia Hospital	The Dalles, Ore.
O'Brien, Mrs. Daisy	Holmes Lane	Oregon City, Ore.
Paulson, Ida C.	Oregon City Hospital	Oregon City, Ore.
Pobochenko, Ruth	6415 S. E. Morrison St.	Portland, Ore.
Sister A. de Boheme	St. Vincent's Hospital	Portland, Ore.
Sister Ottilia	St. Mary's Hospital	Astoria, Ore.
Wilhelm, Hazel I.	3424 N. E. Tillamook St.	Portland, Ore.
Williams, Mary D.	2475 N. W. Westover Rd.	Portland, Ore.
Wilmot, Katurah M.	2026 S. E. Elliott Ave.	Portland, Ore.

PENNSYLVANIA

Abary, Edith E.	Harrisburg Hospital	Harrisburg, Pa.
Anderson, Maude	Elk Co. General Hospital	Ridgway, Pa.
Arnold, Dorothy	Indiana Memorial Hospital	Indiana, Pa.
Barie, Elfreda	St. John's Hospital, N. S.	Pittsburgh, Pa
Barratt, May E.	Hahnemann Hospital	Scranton, Pa.
Beringer, Mary Louise	Rochester Gen'l Hospital	Rochester, Pa.
Blum, Mildred M.	Altoona Hospital	Altoona, Pa.
Borgstrom, Hilma C.		
Bowkley, Naomi E.	Wyoming Valley Homeopathic Hospital	Wilkes-Barre, Pa.
Brady, Sara I.	St. Joseph's Hospital	Pittsburgh, Pa.
Breaky, Nettie		Brookville, Pa.
Bucher, Sara K.	610 W. Lemon St.	Lancaster, Pa.
Brubaker, Juliet E.	Pennsylvania Hospital	Philadelphia, Pa.
Brubaker, Marion E.	Conemaugh Val'y Mem. Hosp.	Johnstown, Pa.
Byers, Gertrude S.	Allegheny Gen'l Hospital	Pittsburgh, Pa.
Cain, Leota B.	Carbondale Gen'l Hospital	Carbondale, Pa.
Campbell, Clara B.	637 Walnut St.	McKeesport, Pa.
Carpenter, Lena	General Hospital	Wilkes-Barre, Pa.
Cleaver, Kathryn E.	Mercy Hospital	Wilkes-Barre, Pa.
Charlton, Mrs. Ethel G.	Coatesville, Hospital	Coatesville, Pa.
Cool, Mary E.	West Penn Hospital	Pittsburgh, Pa.
Crandall, Helen M.	Wyoming Valley Homeopathic	Wilkes-Barre, Pa.
Davies, Marian	Moses Taylor Hospital	Scranton, Pa.
Davis, Edith	Allentown Hospital	Allentown, Pa.
Davis, Elizabeth F.	South Side Hospital	Pittsburgh, Pa.
Davis, Elizabeth M.	Palmerton Hospital	Palmerton, Pa.
Davis, Hester V. P.	Germantown Hospital	Philadelphia, Pa.
Degutis, Margaret M.	Pottsville State Hospital	Pottsville, Pa.
Dibert, Helen L.	Kane Community Hospital	Kane, Pa.

Donovan, Rose G.*	Mount Sinai Hospital	Philadelphia, Pa.
Dougherty, Gertrude	Canonsburg General Hospital	Canonsburg, Pa.
Dougherty, Loretta A.	8046 Jenkins Arcade	Pittsburgh, Pa.
Emerick, Ida McK.	Rochester General Hospital	Rochester, Pa.
Fischler, Dorothy F.	Robert Packer Hospital	Sayre, Pa.
Foote, Belle R.	Robert Packer Hospital	Sayre, Pa.
Foster, Anne B.	Citizens General Hospital	New Kensington, Pa.
Freeland, Mrs. Eva F.	Greene Co. Mem'l Hospital	Waynesburg, Pa.
Fulton, Faye L.	Methodist Episcopal Hospital	Philadelphia,Pa.
Gagliardi, Katharine F.	Lankenau Hospital	Philadelphia, Pa.
Gallon, Martha	Jewish Hospital	Philadelphia, Pa.
Gaumer, Mrs. Miriam	422 First St.	Lakewood, N. J.
Gegg, Agnes	Lancaster Gen'l Hospital	Lancaster, Pa.
Giffen, Margaret M.	Valley Hospital	Sewickley, Pa.
Gilmore, Ruth S.	Butler Co. Mem'l Hospital	Butler, Pa.
Glinz, Mary J.	Kensington Hosp. for Women	Philadelphia, Pa.
Goff, Anne C.	720 Marlyn Road	Philadelphia, Pa.
Grant, Anna Katherine	Comemaugh Valley Hospital	Johnstown, Pa.
Haberstroh, Ruth C.	Mercy Hospital	Altoona, Pa.
Hagenbach, Beatrice	Maple Avenue Hospital	DuBois, Pa.
Haines, Alverta K.	Altoona Hospital	Altoona, Pa.
Hartenstein, Jessie M.	4534 Osage Ave.	Philadelphia, Pa.
Hartshorne,Grace M.	Philipsburg State Hospital	Philipsburg, Pa.
Hastings, Mildred E.	Graduate Hosp. Univ. of Pa.	Philadelphia, Pa.
Hendricks, Martha L.	West Side Hospital	Scranton, Pa.
Hitz, Leta A.	Reading Hospital	Reading, Pa.
Houck, Edna I.	Philipsburg State Hospital	Philipsburg, Pa.
Hunter, Bessie F.	Mt. Sinai Hospital	Philadelphia, Pa.
Ingram, Nancy	Philadelphia General Hospital	Philadelphia, Pa.
Jenkins, Anna T.	State Hospital	Ashland, Pa.
Johnston, Naomi A.	Methodist Episcopal Hospital	Philadelphia, Pa.
Jones, Agnes M.	108 Oakview Ave.	Edgewood, Pa.
Jones, Katherine	Magee Hospital	Pittsburgh, Pa.
Karns, Irene	McKeesport Hospital	McKeesport, Pa.
Kauffman, A. Isabelle	Lancaster General Hospital	Lancaster, Pa.
Keebler, Sarah S.	Jeanes Hospital, Fox Chase	Philadelphia, Pa.
Kenney, Ellen E.	Connellsville State Hospital	Connellsville, Pa.
King, Madeleine M.	848 Park Ave.	Meadville, Pa.
Kissell, Esther M.	Harrisburg Hospital	Harrisburg, Pa.
Kitchen, Mildred		
Knipper, Margaret E.	St. Joseph's Hospital	Philadelphia, Pa.
Kolker, Bessye R.	Mt. Sinai Hospital	Philadelphia, Pa.
Kramlich, R. Margaret	3804 Chestnut St.	Philadelphia, Pa.
Krause, Helen C.	Temple University Hospital	Philadelphia, Pa.
Kutz, Anna M.***	50 W. Main St.	Glen Lyon, Pa.
Lambert, Marcella F.	St. Vincent's Hospital	Erie, Pa.
Langdon, Kathryn L.	J. C. Blair Mem'l Hospital	Huntingdon, Pa.
Laurence, Beatrix M.	Bradford Hospital	Bradford, Pa.
Leidy, Mrs. Albertine R.	6417 Limekiln Pike, East Germantown	Philadelphia, Pa.
Lewis, Hazel M.	Graduate Hospital	Philadelphia, Pa.
Lewis, Rhoda	General Hospital	Wilkes-Barre, Pa.
Light, Dorothy C.	115 S. Railroad St.	Hummelstown, Pa.
Ligon, Maurine	126 So. 40th, Apt. 212	Philadelphia, Pa.
Linden, Christine E.	Pittston State Hospital	Pittston, Pa.
Lloyd, M. Elizabeth	1232 So. 45th St.	Philadelphia, Pa.
Longley, Ella	Williamsport Hospital	Williamsport, Pa.
Lockwood, Jennie M.	St. Joseph's Hospital	Philadelphia, Pa.
MacCullough, Sylvia I.	Jewish Hospital	Philadelphia, Pa.

McCormick, Marg.***	1425 Vine St.	Scranton, Pa.
McGeary, Mary V.	St. Mary's Hospital	Philadelphia, Pa.
McKean, Bertha Pingel	Passavant Hospital	Pittsburgh, Pa.
McKeon, Anna	Armstrong Co. Hospital	Kittanning, Pa.
McLaughlin, Lucille C.	Warren General Hospital	Warren, Pa.
McTurk, Theresa A.	Metropolitan Hospital	Philadelphia, Pa.
Machusak, Anne	Polyclinic Hospital	Harrisburg, Pa.
MacNeil, Lillian F.	St. Christopher & Children's Hospital	Philadelphia, Pa.
Maguire, Mary A.	Women's College Hospital, East Falls	Philadelphia, Pa.
Maguire, Sarah A.	Franklin Hospital	Franklin, Pa.
Malloy, Muriel F.		
Margison, Mathilda M.	St. Francis Hospital	Pittsburgh, Pa.
Martin, Ruth L.	Chambersburg Hospital	Chambersburg, Pa.
Mattson, Sophia H.	Beaver Valley Gen'l Hosp.	New Brighton, Pa.
Mayer, Amelia	Homeopathic Hospital	Pittsburgh, Pa.
Meszaros, Rose	Temple University Hospital	Philadelphia, Pa.
Millard, Elizabeth J.	General Hospital	Lancaster, Pa.
Miller, Anna J.	5506 5th Ave.	Pittsburgh, Pa.
Miller, Mary E.	York Hospital	York, Pa.
Miller, Emma A.	Graduate Hospital	Philadelphia, Pa.
Miller, Zella C.	Jameson Memorial Hospital	New Castle, Pa.
Nelson, Thelma	Geisinger Memorial Hospital	Danville, Pa.
Oaks, Isabelle	Jefferson Hospital	Philadelphia, Pa.
Oberholtzer, Irene S.	Pottstown Hospital	Pottstown, Pa.
O'Harra, Marian	Centre Co. Hospital	Bellefonte, Pa.
Page, Julia E.	Chester Co. Hospital	West Chester, Pa.
Palmer, Elsie M.	Children's Hospital	Pittsburgh, Pa.
Payne, Edith D.	Univ. of Penna. Hospital	Philadelphia, Pa.
Perry, Helen	Allegheny General Hospital	Pittsburgh, Pa.
Pflieger, Bregetta F.	Mercy Hospital	Johnstown, Pa.
Plowman, Katherine A.	Harrisburg Hospital	Harrisburg, Pa.
Pnellie, Lena Mary	Elk Co. Gen'l Hospital	Ridgway, Pa.
Ponesmith, Mrs. S. S.	York Hospital	York, Pa.
Powell, Dora E.	Taylor Hospital	Ridley Park, Pa.
Puett, Martha	242 South Highland Ave.	Pittsburgh, Pa.
Rapp, Elizabeth	Lankenau Hospital	Philadelphia, Pa.
Rau, Mary M.	Shelby Hospital	Ellwood City, Pa.
Ray, Mary M.	Andrew Kaul Mem'l Hospital	St. Mary's, Pa.
Render, Gertrude	Homestead Hospital	Homestead, Pa.
Richardson, Fleda M.	Homeopathic Hospital	Pittsburgh, Pa.
Richter, Leola M.	Presbyterian Hospital	Pittsburgh, Pa.
Ritzert, Mildred	Eye and Ear Hospital	Pittsburgh, Pa.
Robinson, Marian L.	Pennsylvania Hospital	Philadelphia, Pa.
Roenbaugh, Mary A.	West Penn Hospital	Pittsburgh, Pa.
Rose, Marie Sophie	St. Margaret Mem'l Hospital	Pittsburgh, Pa.
Sister M. Alacoque	St. Joseph's Hospital	Pittsburgh, Pa.
Sister M. A. Wagner	St. Vincent's Hospital	Erie, Pa.
Sister Bonosa	Sacred Heart Hospital	Allentown, Pa.
Sister M. Grace King	Mercy Hospital	Johnstown, Pa.
Sister J. T. McHugh	St. Joseph's Hospital	Pittsburgh, Pa.
Sister M. Ludgeris***	Sacred Heart Hospital	Norristown, Pa.
Sister M. M. McMahon	Pittsburgh Hospital	Pittsburgh, Pa.
Sister M. Pulcheria	A. C. Milliken Hospital	Pottsville, Pa.
Sister M. Theodefrieda	Sacred Heart Hospital	Allentown, Pa.
Sister M. T. Hale	St. John's Gen'l Hospital	Pittsburgh, Pa.
Salomon, Hilda R. (Life Member)	Jewish Hospital	Philadelphia, Pa.

Schramm, Mrs. Naomi McAfee***	1621 Fourth St.	New Brighton, Pa.
Schwab, Florence	Temple University Hospital	Philadelphia, Pa.
Scott, Lora E.	Robert Packer Hospital	Sayre, Pa.
Shaughnessy, Helen C.	St. Agnes Hospital	Philadelphia, Pa.
Shekletski, Blanche	Jewish Hospital	Philadelphia, Pa.
Shellenberger, Frances	Montefiore Hospital	Pittsburgh, Pa.
Sherman, Martha C.	530 Locust St.	McKeesport, Pa.
Sisson, Daisy	St. Luke's Hospital	Bethlehem, Pa.
Smiser, Elizabeth S.	Chestnut Hill Hospital	Philadelphia, Pa.
Smith, Alice C.	38 Mill St.	Pittston, Pa.
Smith, Mrs. M. W.***	3916 Beechwood Blvd.	Pittsburgh, Pa.
Sprecher, Esther M.	St. Joseph's Hospital	Reading, Pa.
Staiger, Esther M.	269 So. 19th St.	Philadelphia, Pa.
Stewart, Ida	Titusville Hospital	Titusville, Pa.
Strausser, Helen C.	Shamokin State Hospital	Shamokin, Pa.
Strayer, Mary C.	Conemaugh Val. Mem. Hosp.	Johnstown, Pa.
Sugg, Norma	University Hospital	Philadelphia, Pa.
Suter, Magdalene	Girard College Infirmary	Philadelphia, Pa.
Sybert, Jennie M.	State Hospital	Connellsville, Pa.
Taglieber, Mabel	736 Haws Ave.	Norristown, Pa.
Tamm, Helene	Elizabeth Steel Magee Hosp.	Pittsburgh, Pa.
Tash, Kathryn Luni	523 Hampshire Rd.,Drexel Pk.	Delaware Co., Pa.
Thomas, Anna	Wilkes-Barre Gen. Hospital	Wilkes-Barre, Pa.
Thomas, Sara S.	129 E. Edison Ave.	New Castle, Pa.
Ulshafer, Nellie	State Hospital	Hazleton, Pa.
Ungerman, Florence E.	Homeopathic Hospital	Pittsburgh, Pa.
Unks, Margaret C.	Mercy Hospital	Pittsburgh, Pa.
Valentine, Rose M.	St. Joseph's Hospital	Lancaster, Pa.
Van Aux, Caroline	Scranton State Hospital	Scranton, Pa.
VanderBurgh, G. G.	Williamsport Hospital	Williamsport, Pa.
Viehmann, Margaret	5523 Catherine St.	Philadelphia, Pa.
Vogel, Adelinda A.	223 Grant Ave.	Millvale, Pa.
Wagner, Florence E.	Pennsylvania Hospital	Philadelphia, Pa.
Walton, Florence E.	Mercy Hospital	Pittsburgh, Pa.
Walker, Mrs. Helen Y.**	1824 Wallace St.	Philadelphia, Pa.
Wandell, Eloise P.	Nesbitt Memorial Hospital	Kingston, Pa.
Weber, Lillian	Montefiore Hospital	Pittsburgh, Pa.
Weidman, Beatrice A.	Episcopal Hospital	Philadelphia, Pa.
West, Louise	Abington Memorial Hospital	Abington, Pa.
Westbrook, Edith	Episcopal Hospital	Philadelphia, Pa.
Westcott, Mabel L.	State Hospital	Nanticoke, Pa.
White, Isabella W.	1421 Arch St.	Philadelphia, Pa.
Whitman, Irene	Frankford Hosp., Frankford	Philadelphia, Pa.
Wigmore, Mary A. McB.	Greenville Hospital	Greenville, Pa.
Williams, Grace	Allegheny General Hospital	Pittsburgh, Pa.
Windisch, Elsa F.***	5214 North 3rd St.	Philadelphia, Pa.
Wood, Ruth L.	Pennsylvania Hospital	Philadelphia, Pa.
Wright, Dorothy E.	Mt. Sinai Hospital	Philadelphia, Pa.
Wright, Grace B.	R. D. No. 1	Ellwood City, Pa.
Yarnall, Catherine E.	U. S. Naval Hospital	Philadelphia, Pa.
Yerger, Margaretta S.	505 Palmer Ave.	Patton, Pa.
Yocum, Florence M.	365 Mt. Vernon St.	Lansdale, Pa.
Young, Isidora M.	Mercy Hospital	Pittsburgh, Pa.
Zeiser, Katherine	94 Pine St.	Lewistown, Pa.

RHODE ISLAND

MacLeod, Katherine G.	Rhode Island Hospital	Providence, R. I.

SOUTH CAROLINA

Davies, Eliza H.	Roper Hospital	Charleston, S. C.
Donnan, Jane	1430 Marion St.	Columbia, S. C.
Hinnant, Mary F.	1417 Hampton Ave.	Columbia, S. C.
Meyer, Annie J.	279 Meeting St.	Charleston, S. C.
O'Leary, Glena B.	Roper Hospital	Charleston, S. C.
Sister M. Hilda Rieder	Saint Philip Mercy Hospital	Rock Hill, S. C.
Sweet, Marjorie H.	Roper Hospital	Charleston, S. C.

SOUTH DAKOTA

Bralley, Belva B.	803 South St.	Rapid City, S. D.
Reagan, Genevieve	Sioux Valley Hospital	Sioux Falls, S. Dak.
Sister M. A. McDonnell	Our Lady of Lourdes Hospital	Hot Springs, S. Dak.
Sister M. C. Shealy	McKennan Hospital	Sioux Falls, S. Dak.
Sister M. Celine	St. Luke's Hospital	Aberdeen, S. Dak.
Sister M. Cornelia	St. Luke's Hospital	Aberdeen, S. Dak.
Sister M. E. Seman	St. John's Hospital	Rapid City, S. Dak.
Sister M. Eulalia	St. Joseph's Hospital	Mitchell, S. Dak.
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Sister M. L. Schendt	Our Lady of Lourdes Hospital	Hot Springs, S. Dak.
Sister M. Luke	St. Luke's Hospital	Aberdeen, S. Dak.
Sister M. Matilda	St. Joseph's Hospital	Mitchell, S. Dak.
Sister M. R. McCormick	McKennan Hospital	Sioux Falls, S. Dak.
Skinner, Marjory M.	St. Joseph's Hospital	Deadwood, S. Dak.
Wright, Grace A., Mrs.	c/o Deer Huts, Keystone Star Route	Rapid City, S. D.

TENNESSEE

Bryant, Nettie M.	c/o Drs. Lewis and Lewis Exchange Bldg.	Memphis, Tenn.
Caldwell, Bessie	Takoma Hospital & San.	Greeneville, Tenn.
Crabtree, Willie C.	c/o Dr. Geo. C. Williamson	Columbia, Tenn.
DeLoach, Mary T.	708 Sterick Bldg.	Memphis, Tenn.
Estes, Mary L.	Children's Hospital	Chattanooga, Tenn.
Fink, Jewelle C.	1418 Madison	Memphis, Tenn.
Hawne, R. Ethel	1265 Union	Memphis, Tenn.
Hemsley, Ada	Methodist Hospital	Memphis, Tenn.
Hobson, Archie D.	Fort Sanders Hospital	Knoxville, Tenn.
Houser, Mrs. Jennie*	John Gaston Hospital	Memphis, Tenn.
Karlovic, Mary S.	St. Thomas Hospital	Nashville, Tenn.
Kemp, Elizabeth L.	Forrest Park Apts.	Memphis, Tenn.
Kooyman, Jacqueline C.	John Gaston Hospital	Memphis, Tenn.
Little, Alice	Methodist Hospital	Memphis, Tenn.
Lowell, Mattie B.		Murfreesboro, Tenn.
McElroy, Mary Jean	1914 Grand Ave.	Nashville, Tenn.
Mockbee, Mattie C.	Hospital for Crippled Adults	Memphis, Tenn.
O'Brien, Jean**	869 Madison Ave.	Memphis, Tenn.
Sims, Alice M.	1301 Eastmoreland	Memphis, Tenn.
Sinquefield, Mrs. N. K.	Davidson Co. Tuber. Hosp.	Nashville, Tenn.
Taylor, Minta H.	John Gaston Hospital	Memphis, Tenn.
Troster, Gertrude A.	654 Stonewall Place	Memphis, Tenn.
Vickers, Hattie	Vanderbilt Univ'sity Hospital	Nashville, Tenn.
Williams, Jennie F.	St. Thomas Hospital	Nashville, Tenn.

TEXAS

Armstrong, Jessie	Route 2	Corsicana, Tex.
Baker, Mrs. Gertrude E.	234 W. Beauregard St.	San Angelo, Tex.
Beck, Osa	Medical & Surgical Clinic	San Angelo, Tex.
Brockman, Bessie M.	St. Paul's Hospital	Dallas, Tex.
Buckner Margaret M.	Coffey Clinic	Fort Worth, Tex.

Cable, Marcella A.	Hermon Hospital	Houston, Tex.
Campbell, Allie M.	W. I. Cook Memorial Hospital	Fort Worth, Tex.
DeLay, Martha	Sanitarium of Paris	Paris, Tex.
DeVet, Friedah M.		
Drucke, Cliffie B.	Waxahachie Sanitarium	Waxahachie, Tex.
Dumas, Frances E.	Graham Hospital	Graham, Tex.
East, Lettie V.	General Hospital	Wichita Falls, Tex.
Green, Alvaretta	All Saints Hospital	Fort Worth, Tex.
Haas, Minnie V.	Methodist Hospital	Ft. Worth, Tex.
Harrist, Margaret E.	Lubbock Sanitarium	Lubbock, Tex.
Hoadley, Dorothy M.*	Methodist Hospital	Ft. Worth, Tex.
King, Evelyn K.	Seton Infirmary	Austin, Tex.
Kirven, Sarah	Torbell Sanitarium	Marlin, Tex.
Larsen, Sylvia J.	Lubbock Sanitarium	Lubbock, Tex.
McLeod, Catherine S.	McKinney City Hospital	McKinney, Tex.
Mercer, Ora Lee**	207 Medical Arts Bldg.	Ft. Worth, Tex.
Mills, Beatrice J.	St. Paul's Hospital	Dallas, Tex.
Olmstead, Ola	Coffey Clinic	Fort Worth, Tex.
Rape, Vergie E.	W. Texas Baptist Sanitarium	Abilene, Tex.
Richardson, Grace	2624 Greene Ave.	Fort Worth, Tex.
Riek, Lucia L.	St. Paul's Hospital	Dallas, Tex.
Roemmele, Rena F.	Parkland Hospital	Dallas, Tex.
Schriver, Katherine K.	c/o Dr. Marion M. Brown	Mexia, Tex.
Shaver, Elvie Mae	John Sealy Hospital	Galveston, Tex.
Smith, Gertrude	208 Medical Arts Bldg.	Fort Worth, Tex.
Taylor, Mrs. Wilmoth B.	P. & S. Hospital	Corsicana, Tex.
Thompson, Florence	3116 Live Oak St.	Dallas, Tex.
Thompson, Velma G.	Baylor University Hospital	Dallas, Tex.
Thomson, Margaret C.	2201 Welborn St.	Dallas, Tex.
Ulcak, Otelia	Methodist Hospital	Dallas, Tex.
Vanderwood, Lena	Wm. Beaumont Hospital	El Paso, Tex.
Warren, Grace	704 Highland Ave.	Houston, Tex.
Wells, Mrs. Jewell Reed	Texarkana Hospital	Texarkana, Tex.

UTAH

Hood, Gladys	L. D. S. Hospital	Salt Lake City, Utah
Lemon, Mary	L. D. S. Hospital	Salt Lake City, Utah
Mulvane, Lucile	L. D. S. Hospital	Salt Lake City, Utah

VERMONT

Richards, Maude E.	Brattleboro Mem'l Hospital	Brattleboro, Vt.

VIRGINIA

Addleman, Ollie M.	Cabaniss Hall	Richmond, Va.
Beal, Mrs. Edna N.**	Cabaniss Hall	Richmond, Va.
Copeland, Vera G.	St. Elizabeth's Hospital	Richmond, Va.
Cox, Mrs. Marion A.	212—50th St.	Newport News, Va.
Doss, Mrs. Julia B.		Penn Hook, Va.
Duncan, Mrs. Davida***	Breezy Heights	Lexington, Va.
Forgie, Nancy F.	1503 Grace St.	Lynchburg, Va.
Godbey, C. Virginia*	Norfolk Protestant Hospital	Norfolk, Va.
Hall, Esther H.		Nassawadox, Va.
Leftwich, Gladys L.	Lewis Gale Hospital	Roanoke, Va.
MacGregor, Elizabeth N.	Alexandria Hospital	Alexandria, Va.
Medlin, Addie F.	Protestant Hospital	Norfolk, Va.
Ogle, Cora Lee		Barren Springs, Va.
Payne, Mrs. Minnie F.	University of Va. Hospital	University, Va.
Ponti, Katherine	U. S. Marine Hospital	Norfolk, Va.
Riner, Essie Flagg	Roanoke Hospital	Roanoke, Va.
Scott, Georgia C.	Lewis-Gale Hospital	Roanoke, Va.

Spencer, Mary B.***	U. S. Marine Hospital	Norfolk, Va.
Supinger, Virginia S.	Riverside Hospital	Newport News, Va.
Ward, Eloise S.	Norfolk Gen'l Hospital	Norfolk, Va.
Wells, Hazel Bagby	Dixie Hospital	Hampton, Va.
WASHINGTON		
Barton, Rose C.	Aberdeen General Hospital	Aberdeen, Wash.
Boyer, Alpha J.	St. Luke's Hospital	Spokane, Wash.
Butler, Mae D.	Sacred Heart Hospital	Spokane, Wash.
Chapman, Sylvia M.	Tacoma General Hospital	Tacoma, Wash.
Claude, Alice M.	610 East 26th Ave.	Spokane, Wash.
Cookson, M. Frances	N. 2727 Crestline St.	Spokane, Wash.
Downing, Ruth	Providence Hospital	Seattle, Wash.
Edin, Ruth M.	Providence Hospital	Seattle, Wash.
Ellstrom, Edith	Swedish Hospital	Seattle, Wash.
Espe, Ida L.	Swedish Hospital	Seattle, Wash.
Gill, Edyth M.	Pierce County Hospital	Tacoma, Wash.
Grunefelder, Emma E.	Hoquiam Gen'l Hospital	Hoquiam, Wash.
Hynson, Gene	4727 Brooklyn Ave.	Seattle, Wash.
Icsman, Elizabeth H.	General Hospital	Port Angeles, Wash.
Kester, Mrs. Hilda H.	329 S. Elm St.	Colville, Wash.
Koski, Elsa A.	Tacoma General Hospital	Tacoma, Wash.
Layton, Marguerite	So. 702 Lake St.	Colfax, Wash.
Leonard, Mary E.	Paulsen M. & D. Hospital	Spokane, Wash.
Lothspeich, Sabina		Colfax, Wash.
Myers, Leone M.		
O'Neil, Charlotte V.	Paulsen M. & D. Hospital	Spokane, Wash.
Roberts, June C.	Sacred Heart Hospital	Spokane, Wash.
Pursell, Emily S.	10 South 9th Ave.	Yakima, Wash.
Quin, Beatrice M.	Station Hospital	Ft. Lewis, Wash.
Rudkin, Esther	Deaconess Hospital	Spokane, Wash.
Sister M. H. St.Germain	Providence Hospital	Seattle, Wash.
Sister Peter of A. Adam	St. Ignatius Hospital	Colfax, Wash.
Sister Joseph of A. Hitu	Providence Hospital	Seattle, Wash.
Scully, Elizabeth A.	Deaconess Hospital	Spokane, Wash.
Tramm, Mary E.	Deaconess Hospital	Spokane, Wash.
Trapp, Clara M.	Sacred Heart Hospital	Spokane, Wash.
Wigen, Ragna P.	Ridpath Hotel	Spokane, Wash.
WEST VIRGINIA		
Derwal, Lillian I.	General Delivery	Charleston, W. Va.
Ebandjieff, Evelyn G.	Grace Hospital	Welch, W. Va.
Reed, Pearl F.	Oak Hill Hospital	Oak Hill, W. Va
Strothers, Thelma S.	Beckley Hospital	Beckley, W. Va.
Thayer, Ruth A.	Ohio Valley Gen'l Hospital,	Wheeling, W. Va.
Tierney, Mary A.	St. Mary's Hospital	Clarksburg, W. Va.
Weisman, Rose Semer		Parsons, W. Va.
WISCONSIN		
Baumgartner, Lottie M.	1821 W. Wisconsin Ave.	Milwaukee, Wis.
Beckman, Helena M.	St. Mary's Hospital	Superior, Wis.
Berg, Mabel	721 N. 17th St.	Milwaukee, Wis.
Brennan, Florence	3669 E. Allerton Ave.	Cudahy, Wis.
Bridenhagen, Leona	Bellin Memorial Hospital	Green Bay, Wis.
Cameron, Catherine*	St. Joseph's Hospital	Milwaukee, Wis.
Campbell, Julia I.	619 N. 16th St.	Milwaukee, Wis.
Craig, Grace-Mary	3421 W. Wells, Apt. 205	Milwaukee, Wis.
Crowley, Mechtildes C.	733 S. Webster Ave.	Green Bay, Wis.
Donovan, Mary	Milwaukee Co. Gen'l Hospital	Milwaukee, Wis.
Esval, Sigrid	Luther Hospital	Eau Claire, Wis.
Flasch, Ada Mary	St. Mary's Hospital	Milwaukee, Wis.

Grams, Charlotte L.	Luther Hospital	Eau Claire, Wis.
Harker, Nancy M.	Mt. Sinai Hospital	Milwaukee, Wis.
Harkins, Catherine	2320 N. Lake Drive	Milwaukee, Wis.
Higgins, Leona Rauch	2213 Oakridge Ave.	Madison, Wis.
Hess, Amanda	Mt. Sinai Hospital	Milwaukee, Wis.
Hurff, Evelyn**	Columbia Hospital	Milwaukee, Wis.
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Johnson, Mabel E.	Evang. Deaconess Hospital	Monroe, Wis.
Johnson, Mary Lucille	Luther Hospital	Eau Claire, Wis.
Kraft, Marie	Methodist Hospital	Madison, Wis.
Laughlin, Rose	Mt. Sinai Hospital	Milwaukee, Wis.
Maechtle, Ora R.	Milwaukee Gen'l Hospital	Milwaukee, Wis.
Magnin, Martha M.	Deaconess Hospital	Milwaukee, Wis.
Maki, Saima M.	(No address)	
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Phillips, M. Louise	St. Mary's Hospital	Madison, Wis.
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Sister M. A. Gerber***	Mercy Hospital	Oshkosh, Wis.
Sister M. Bernadette	St. Joseph's Hospital	Milwaukee, Wis.
Sister JohanelleWoityna	St. Vincent's Hospital	Green Bay, Wis.
Sister M. Conradine***	St. Joseph's Hospital	Milwaukee, Wis.
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Sister St. Patricia	St. Mary's Hospital	Green Bay, Wis.
Sister St. Henry	Misericordia Hospital	Milwaukee, Wis.
Sister M. T. Henel	St. Mary's Hospital	Wausau, Wis.
Sauer, Olga E.	Milwaukee Hospital	Milwaukee, Wis.
Sedwick, Gertrude	Shawano Municipal Hospital	Shawano, Wis.
Smith, Lucille H.	Evan. Deaconess Hospital	Milwaukee, Wis.
Stranz, Violet L.	St. Joseph's Hospital	Milwaukee, Wis.
Thielen, Leone A.	St. Joseph's Hospital	Milwaukee, Wis.
Ulbricht, Edna L.	St. Luke's Hospital	Milwaukee, Wis.
Voller, Elizabeth M.	St. Elizabeth Hospital	Appleton, Wis.
Weiss, Rose M.	2960 N. 4th St.	Milwaukee, Wis.
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Woodrich, Catherine	St. Mary's Hospital	Milwaukee, Wis.
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WYOMING		
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Beach, Emma B.	Leahi Home Hospital	Honolulu, Hawaii
Berg, Alice E.	Shriner's Hospital	Honolulu, Hawaii
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Gordon, Mabel	Pahala Plantation Hospital	Pahala, Hawaii
Kossack, Theresa	Kapiolani Hospital	Honolulu, Hawaii
MacMillan, Marian	Paia Hospital	Paia Mani, Hawaii
Maxwell, Georgia M.	Kapiolani Maternity and Gynecological Hospital	Honolulu, Hawaii
Morin, Beatrice K.	St. Francis Hospital	Honolulu, Hawaii
Myers, Esther	Queen's Hospital	Honolulu, Hawaii
Pfauser, Chrystine H.	Queen's Hospital	Honolulu, Hawaii

Reames, Mary F.	Kapiolani Maternity Hospital	Honolulu, Hawaii
Thompson, Edna C.	Kula Sanatorium	Waiakoa, Mani, Hawaii
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